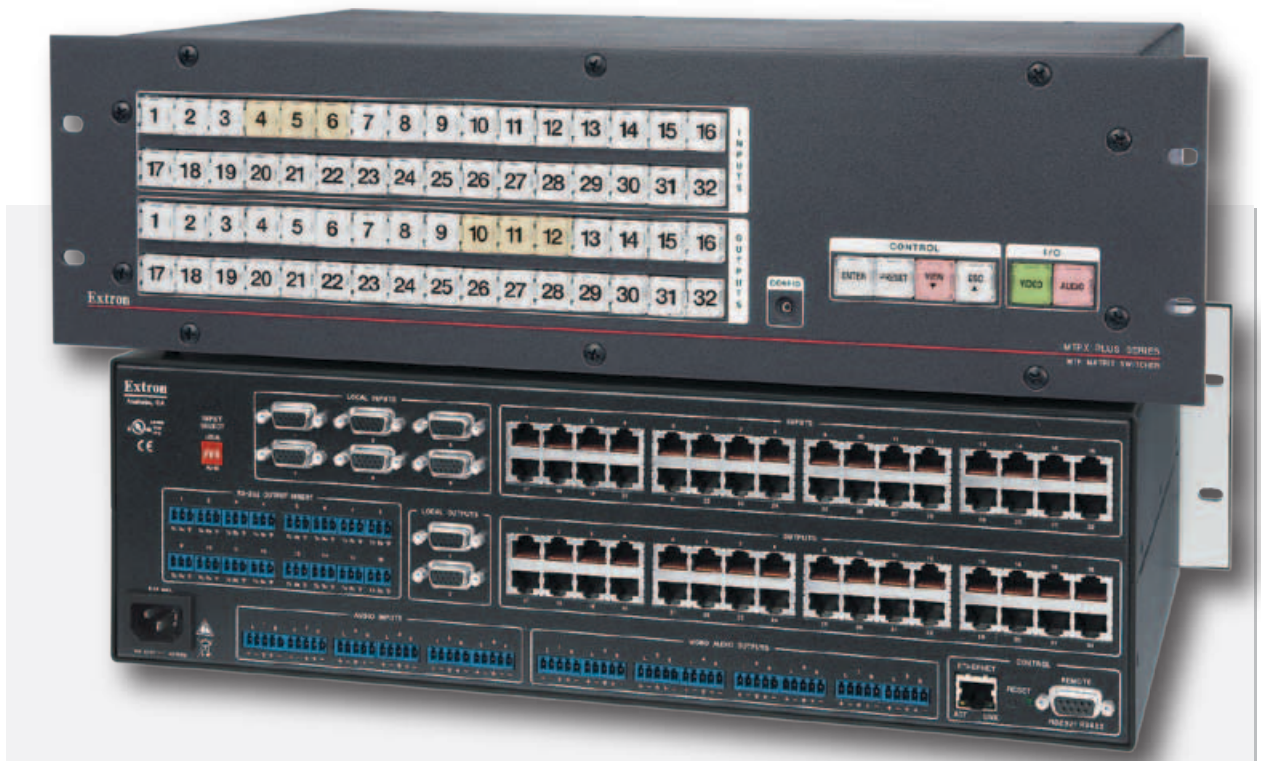


# MTPX Plus Series

MTP Twisted Pair Matrix Switchers



**Extron® Electronics**  
INTERFACING, SWITCHING AND CONTROL

## Safety Instructions • English



This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.



This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

### Caution

**Read Instructions** • Read and understand all safety and operating instructions before using the equipment.

**Retain Instructions** • The safety instructions should be kept for future reference.

**Follow Warnings** • Follow all warnings and instructions marked on the equipment or in the user information.

**Avoid Attachments** • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

## Consignes de Sécurité • Français



Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).



Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

### Attention

**Lire les instructions** • Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

**Conservier les instructions** • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

**Respecter les avertissements** • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

**Eviter les pièces de fixation** • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

## Sicherheitsanleitungen • Deutsch



Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.



Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

### Achtung

**Lesen der Anleitungen** • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits- und Bedienungsanleitungen genau durchlesen und verstehen.

**Aufbewahren der Anleitungen** • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

**Befolgen der Warnhinweise** • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

**Keine Zusatzgeräte** • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

## Instrucciones de seguridad • Español



Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.



Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

### Precaución

**Leer las instrucciones** • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

**Conservar las instrucciones** • Conservar las instrucciones de seguridad para futura consulta.

**Obedecer las advertencias** • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

**Evitar el uso de accesorios** • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrían implicar riesgos.

## 安全须知 • 中文



这个符号提示用户该设备用户手册中有重要的操作和维护说明。



这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

### 注意

**阅读说明书** • 用户使用该设备前必须阅读并理解所有安全和使用说明。

**保存说明书** • 用户应保存安全说明书以备将来使用。

**遵守警告** • 用户应遵守产品和用户指南上的所有安全和操作说明。

**避免追加** • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

## Warning

**Power sources** • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

**Power disconnection** • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

**Power cord protection** • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

**Servicing** • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

**Slots and openings** • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

**Lithium battery** • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

## Avertissement

**Alimentations** • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

**Déconnexion de l'alimentation** • Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

**Protection du cordon d'alimentation** • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

**Réparation-maintenance** • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

**Fentes et orifices** • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

**Lithium Batterie** • Il y a danger d'explosion s'il y a un remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

## Vorsicht

**Stromquellen** • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

**Stromunterbrechung** • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stromversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

**Schutz des Netzkabels** • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

**Wartung** • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

**Schlitze und Öffnungen** • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

**Lithium-Batterie** • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

## Advertencia

**Alimentación eléctrica** • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearla ni eliminarla.

**Desconexión de alimentación eléctrica** • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

**Protección del cables de alimentación** • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

**Reparaciones/mantenimiento** • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

**Ranuras y aberturas** • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

**Batería de litio** • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

## 警告

**电源** • 该设备只能使用产品上标明的电源。设备必须使用有地线的供电系统供电。第三条线（地线）是安全设施，不能不用或跳过。

**拔掉电源** • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

**电源线保护** • 妥善布线，避免被踩踏，或重物挤压。

**维护** • 所有维修必须由认证的维修人员进行。设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

**通风孔** • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。不要有任何东西挡住通风孔。

**锂电池** • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产的建议处理废弃电池。

## FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions:

This device may not cause harmful interference.

1. This device must accept any interference received, including interference that may cause undesired operation.

The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

**NOTE:** This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.  
For more information on safety guidelines, regulatory compliances, EMI/EMF compliance, accessibility, and related topics, [click here](#).

## Conventions Used in this Guide

In this user guide, the following are used:

**NOTE:** A note draws attention to important information.

**TIP:** A tip provides a suggestion to make working with the application easier.

**CAUTION:** A caution indicates a potential hazard to equipment or data.

**WARNING:** A warning warns of things or actions that might cause injury, death, or other severe consequences.

Commands are written in the fonts shown here:

```
^ARMerge Scene, ,Op1 scene 1,1 ^B 51 ^W^C  
[01] R0004 00300 00400 00800 00600 [02] 35 [17] [03]
```

```
Esc[X1 *X21* X24* X23* X25]CE ←
```

**NOTE:** For commands and examples of computer or device responses mentioned in this guide, the character “0” is used for the number zero and “O” represents the capital letter “o.”

Computer responses and directory paths that do not have variables are written in the font shown here:

```
Reply from 208.132.180.48: bytes=32 times=2ms TTL=32  
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

```
ping xxx.xxx.xxx.xxx -t  
SOH R Data STX Command ETB ETX
```

Selectable items, such as menu names, menu options, buttons, tabs, and field names are written in the font shown here:

```
From the File menu, select New.  
Click the OK button.
```

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# Introduction

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- [About the Matrix Switchers](#)
- [TP Cable Advantages](#)
- [Features](#)

## About this Manual

This manual contains installation, configuration, and operating information for the Extron® MTPX Plus MTP Twisted Pair Matrix Switchers.

## About the Matrix Switchers

The MTPX Plus matrix switchers distribute signals that are compatible with the Extron MTP and VTT/VTR product lines. The matrix switcher routes a twisted pair (TP) or video input signal to any combination of TP or video outputs. Depending on the MTP model, the routed TP signal can include RGB or low resolution video and either mono audio or transmitter-to-receiver RS-232 serial communications. The matrix switcher can route multiple input/output configurations simultaneously.

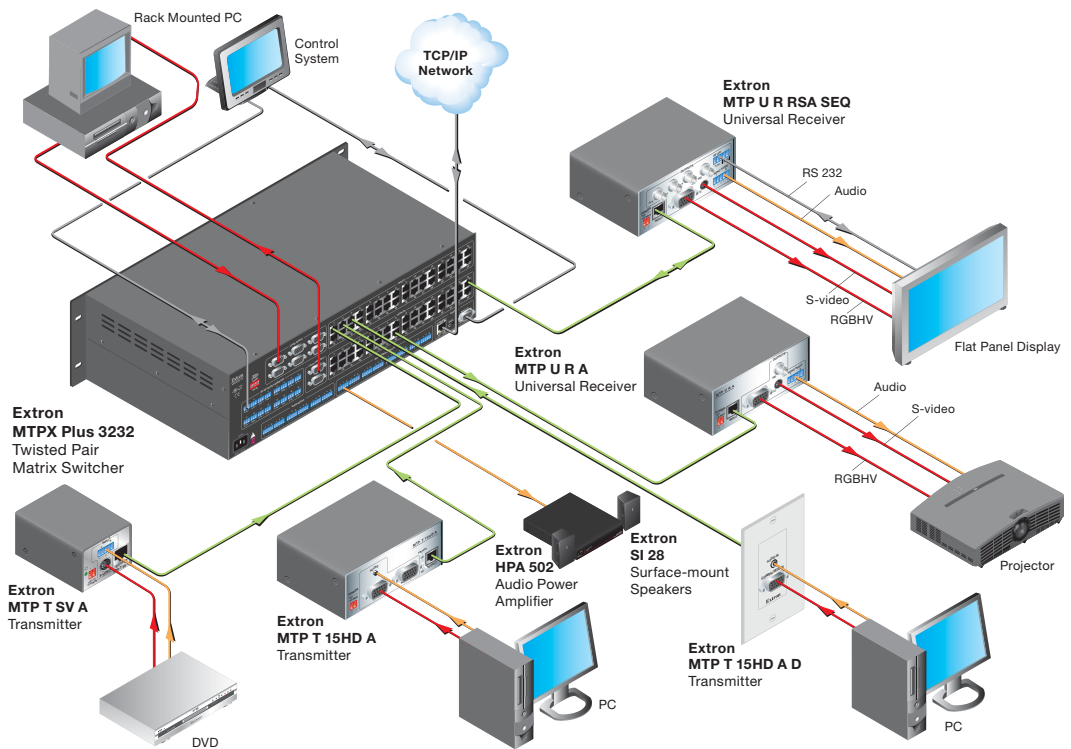
**NOTE:** The receiver-to-transmitter serial communications and remote power capabilities available with certain MTP models are not supported by this matrix switcher.

The matrix switcher is a single box solution (see [figure 1](#) on the next page) to complex TP and video signal routing applications. Each input and output is individually isolated and buffered. Any input can be switched to any one or all outputs with virtually no crosstalk or signal noise between channels. Multiple ties between inputs and outputs can exist simultaneously.

The MTPX Plus series are available in a variety of matrix sizes (the matrix size is the number of inputs and outputs):

- MTPX Plus 816 (8 inputs by 16 outputs)
- MTPX Plus 128 (12 inputs by 8 outputs)
- MTPX Plus 168 (16 inputs by 8 outputs)
- MTPX Plus 1616 (16 inputs by 16 outputs)
- MTPX Plus 1632 (16 inputs by 32 outputs)
- MTPX Plus 3216 (32 inputs by 16 outputs)
- MTPX Plus 3232 (32 inputs by 32 outputs)

The MTPX Plus switchers input and output TP signals on RJ-45 connectors. A pre-peaking feature on selected outputs allows you to boost the transmission distance of the output TP signal.



**Figure 1. Typical MTPX Plus Twisted Pair Matrix Switcher Application**

Additionally, some inputs feature 15-pin HD and 5-pole 3.5 mm captive screw input connectors for local RGB (VGA) and stereo audio inputs without an MTP transmitter. Some outputs feature 15-pin HD output connectors and 5-pole 3.5 mm captive screw ports for local RGB (VGA) and mono audio output without an MTP receiver. The local input and output 15-pin HD connectors can also support HD-YUV video, YUV video, S-video, and composite video.

**NOTE:** For most switchers, the local inputs are an option for use in place of the TP input (input 1 can be either on the local connectors or the TP connector, for example).

For the MTPX Plus 128, four inputs are local only and eight inputs are TP only.

When audio is part of the TP input signal, the audio switching can either be linked with the video (audio follow) or be independent of the video (audio breakaway). Adjustable input audio gain and attenuation compensates for level differences between audio inputs.

**NOTE:** For low resolution MTPs (S-video and composite video) on the TP inputs, the MTPX Plus audio circuits are compatible only with the newer generation, mono audio models. See your MTP transmitter/ receiver and refer to the associated manual to determine which MTP models you have.

The matrix switcher can be remotely controlled via its rear panel Remote port (RS-232/RS-422 for most models, RS-232 only for MTPX Plus 128) and its front panel Configuration port (RS-232 for most models, USB port for MTPX Plus 128) using either Extron Windows®-based Matrix Switchers Control Program or the Simple Instruction Set (SIS™). The SIS is a set of basic ASCII code commands that provides control through a control system or PC without programming long, obscure strings of code.

The switcher can be operated remotely by any of the following when that device is connected to either MTPX Plus serial port:

- A control system
- A PC
- An Extron MKP 2000 remote control panel
- An Extron MKP 3000 remote control panel

For some outputs (most matrix sizes) or all outputs (MTPX Plus 128), bidirectional pass-through RS-232 signals from a dedicated source (rather than from the selected input) can be directly inserted into the signal set routed to the TP output. You can even route RS-232 on a link that is normally audio, such as to an MTP U R 15HD RSA SEQ receiver, which can autodetect whether its signal input includes an audio component or an RS-232 component.

The matrix switchers are housed in metal enclosures. Most models have mounting flanges for standard 19-inch racks built into the enclosure. The MTPX Plus 128 includes a kit for rack mounting.

The switcher has an internal 100 VAC to 240 VAC, 50-60 Hz, 30 watt power supply that provides worldwide power compatibility.

The MTPX Plus switcher has a minimum bandwidth of 300 MHz (-3 dB).

The switchers can also switch RGBS, RGSB, RsGsBs, HDTV, component video, S-video, and composite video.

## TP Cable Advantages

Twisted pair cable is much smaller, lighter, more flexible, and less expensive than coaxial cable. These TP products make cable runs simpler and less cumbersome. Termination of the cable with RJ-45 connectors is simple, quick, and economical.

**CAUTION:** Do not connect this device to a computer data or telecommunications network.

## Transmission distances

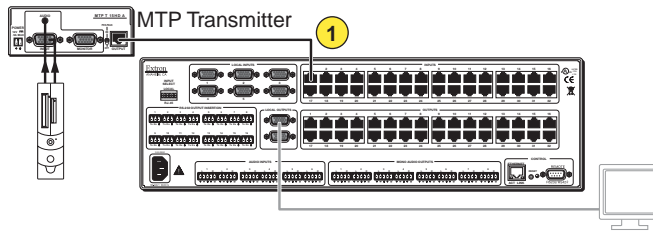
The maximum distances are determined by the frequency and resolution of the video signal being routed and by which MTPX Plus inputs and outputs (TP or local) are in the full (video source to display) routing path. The tables on the following pages specify the recommended maximum transmission distances using Extron Enhanced Skew-Free™ A/V UTP cable or UTP CAT 5, 5e, or 6 cable, terminated with RJ-45 connectors.

- NOTES:**
- For all three tables, the minimum TP cable length should be 25 feet (7.5 m).
  - RS-232 serial communications can be sent up to 1,000 feet (300 m) from the MTP transmitter output (or RS-232 output insert) to the MTP receiver TP input.
  - It is possible to exceed the recommended distances; however, image quality may be reduced.
  - Daisy-chaining MTPX units by connecting a TP output from one matrix switcher to the TP input of a second matrix switcher is not recommended. Daisy chaining in this manner can lead to excessive video smearing.
  - The transmitters, receivers, and matrix switcher are designed for and perform best with Extron Enhanced Skew-Free A/V cable terminated in accordance with the TIA/EIA T 568A wiring standard. CAT 5, 5e, and 6 cables are acceptable, but less preferable. We also recommend the use of preterminated and tested cables. Cables terminated on site should be tested before use to ensure that they comply with Category 5 specifications.
  - Daisy-chaining MTPX units by connecting a TP output from one matrix switcher to the TP input of a second matrix switcher is not recommended. Daisy chaining in this manner can lead to excessive video smearing.
  - The recommendations shown in the tables apply equally for a transmission line that consists of a single transmitter, the switcher, and receiver and for a transmission line that encompasses a transmission daisy chain. For example, the maximum suggested output range (MTPX Plus TP output to MTP receiver) for 1024 x 768 video is 450 feet (135 m) (**table 1** [2]) or 500 feet (150 m) (**table 2** [4]), whether the transmission line consists of the switcher and a single receiver or the switcher and three daisy-chained receivers. This range can be extended to 500 feet or 550 feet if the output is one that has the Pre-Peak function and the function is turned on.
  - For daisy-chained units, the first receiver in the chain should be at least 50 feet (15 m) from the switcher when the Pre-Peak feature is on.
  - For daisy-chained units, any receiver in the chain closer than 350 feet (105 m) may experience some form of over-peaking when the Pre-Peak switch is on. An overpeaked image may appear bloomed.



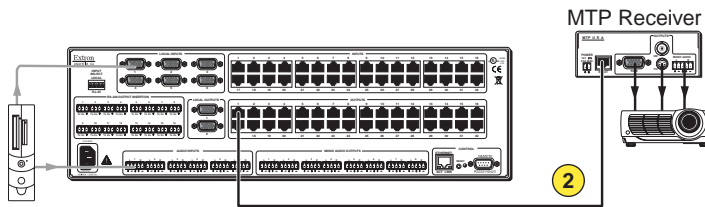
**Table 1.** Recommended maximum TP transmission distances at 60 Hz,

- ① MTP transmitter to switcher when the display is on the MTPX Plus local (VGA) output



— or —

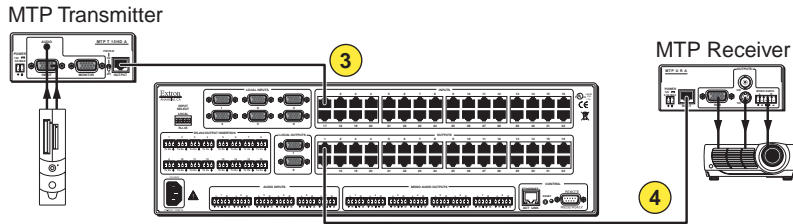
- ② Switcher to MTP receiver when the video source is on the MTPX Plus local (VGA) input



Video format	Sending unit Pre-Peak		Maximum distance	
	Off	On	High quality ①	Variable quality ②
Component, S-video, Composite	<300' (90 m)	>350' (105 m)	800' (285 m)	1,000' (300 m)
640 x 480	<300' (90 m)	>350' (105 m)	700' (215 m)	750' (230 m)
800 x 600	<300' (90 m)	>350' (105 m)	550' (170 m)	650' (200 m)
1024 x 768*	<300' (90 m)	>350' (105 m)	500' (150 m)	600' (185 m)
1280 x 960*	<300' (90 m)	>350' (105 m)	400' (120 m)	500' (150 m)
1280 x 1024*	<250' (75 m)	>300' (90 m)	350' (105 m)	450' (135 m)
1360 x 765	<250' (75 m)	>300' (90 m)	400' (120 m)	500' (150 m)
1365 x 768	<250' (75 m)	>300' (90 m)	400' (120 m)	450' (135 m)
1366 x 768	<250' (75 m)	>300' (90 m)	400' (120 m)	450' (135 m)
1440 x 900	<250' (75 m)	>300' (90 m)	350' (105 m)	400' (120 m)
1400 x 1050	<250' (75 m)	>300' (90 m)	350' (105 m)	400' (120 m)
1600 x 1200*	<250' (75 m)	>300' (90 m)	300' (90 m)	450' (135 m)
1920 x 1200	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)
HDTV 720p	<250' (75 m)	>300' (90 m)	400' (120 m)	500' (150 m)
HDTV 1080i	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)
HDTV 1080p	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)

**NOTE:** Resolutions marked with an asterisk (\*) in this table have the same range specifications at 75 Hz.

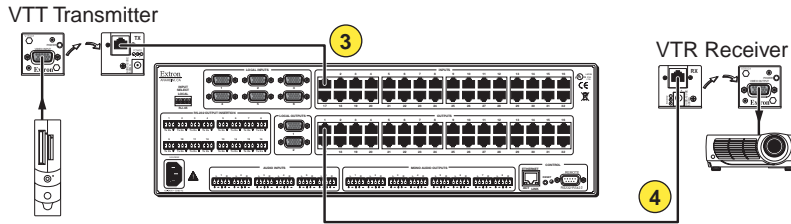
**Table 2. Recommended maximum TP transmission distances at 60 Hz, — transmitter to receiver using MTPX Plus TP inputs and outputs**



Video format	MTPX Pre-Peak		Maximum distance			
	Off	On	High quality		Variable quality	
			MTPX input 3	MTPX output 4	MTPX input 3	MTPX output 4
Component, S-video	<300' (90 m)	>350' (105 m)	700' (215 m)	700' (215 m)	700' (215 m)	800' (245 m)
Composite	<300' (90 m)	>350' (105 m)	700' (215 m)	700' (215 m)	750' (230 m)	750' (230 m)
640 x 480	<300' (90 m)	>350' (105 m)	550' (170 m)	600' (185 m)	600' (185 m)	650' (200 m)
800 x 600	<300' (90 m)	>350' (105 m)	500' (150 m)	500' (150 m)	600' (185 m)	600' (185 m)
1024 x 768*	<300' (90 m)	>350' (105 m)	450' (135 m)	450' (135 m)	550' (170 m)	550' (170 m)
1280 x 960*	<300' (90 m)	>350' (105 m)	350' (105 m)	350' (105 m)	450' (135 m)	450' (135 m)
1280 x 1024*	<250' (75 m)	>300' (90 m)	350' (105 m)	350' (105 m)	450' (135 m)	450' (135 m)
1360 x 765	<250' (75 m)	>300' (90 m)	350' (105 m)	350' (105 m)	500' (150 m)	500' (150 m)
1365 x 768	<250' (75 m)	>300' (90 m)	350' (105 m)	350' (105 m)	450' (135 m)	450' (135 m)
1366 x 768	<250' (75 m)	>300' (90 m)	350' (105 m)	350' (105 m)	450' (135 m)	450' (135 m)
1440 x 900	<250' (75 m)	>300' (90 m)	350' (105 m)	300' (90 m)	400' (120 m)	400' (120 m)
1400 x 1050	<250' (75 m)	>300' (90 m)	350' (105 m)	300' (90 m)	400' (120 m)	400' (120 m)
1600 x 1200*	<250' (75 m)	>300' (90 m)	300' (90 m)	300' (90 m)	450' (135 m)	450' (135 m)
1920 x 1200	<200' (60 m)	>250' (75 m)	300' (90 m)	250' (75 m)	400' (120 m)	400' (120 m)
HDTV 720p	<250' (75 m)	>300' (90 m)	400' (120 m)	400' (120 m)	500' (150 m)	500' (150 m)
HDTV 1080i	<200' (60 m)	>250' (75 m)	300' (90 m)	250' (75 m)	400' (120 m)	400' (120 m)
HDTV 1080p	<200' (60 m)	>250' (75 m)	300' (90 m)	250' (75 m)	400' (120 m)	400' (120 m)

**NOTE:** Resolutions marked with an asterisk (\*) in this table have the same range specifications at 75 Hz.

**Table 3. Recommended maximum TP transmission distances at 60 Hz, — VTT transmitter to VTR receiver using MTPX TP inputs and outputs**



Video format	MTPX Pre-Peak		Maximum distance			
	Off	On	High quality MTPX input 3	High quality MTPX output 4	Variable quality MTPX input 3	Variable quality MTPX output 4
640 x 480	<300' (90 m)	>350' (105 m)	400' (120 m)	350' (105 m)	400' (120 m)	400' (120 m)
800 x 600	<250' (75 m)	>300' (90 m)	350' (105 m)	300' (90 m)	400' (120 m)	350' (105 m)
1024 x 768	<150' (45 m)	>200' (60 m)	300' (90 m)	300' (90 m)	350' (105 m)	350' (105 m)
1280 x 960	<150' (45 m)	>200' (60 m)	250' (75 m)	200' (60 m)	300' (90 m)	300' (90 m)
1280 x 1024	<150' (45 m)	>200' (60 m)	250' (75 m)	200' (60 m)	300' (90 m)	250' (75 m)
1360 x 765	<150' (45 m)	>200' (60 m)	250' (75 m)	200' (60 m)	300' (90 m)	250' (75 m)
1365 x 768	<150' (45 m)	>200' (60 m)	250' (75 m)	200' (60 m)	300' (90 m)	250' (75 m)
1366 x 768	<150' (45 m)	>200' (60 m)	250' (75 m)	200' (60 m)	300' (90 m)	250' (75 m)
1440 x 900	<150' (45 m)	>200' (60 m)	200' (60 m)	200' (60 m)	250' (75 m)	250' (75 m)
1400 x 1050	<150' (45 m)	>200' (60 m)	200' (60 m)	200' (60 m)	250' (75 m)	250' (75 m)
1600 x 1200	<100' (30 m)	>150' (45 m)	200' (60 m)	150' (45 m)	250' (75 m)	200' (60 m)

## Skew equalization

Skew exists between wire pairs when the physical length of one wire pair is different from another. Skew affects the displayed image when the differential length between wire pairs exceeds 2 feet. This causes the timing of the red, green, and blue video signals to appear out of alignment (horizontal registration errors). The signals transmitted on the shortest pair are shifted to the left if you are viewing white lines on a black background. A white vertical line on a black field can appear as individual red, green, and blue lines that are close together. The signal transmitted on the shortest wire pair leads the other colors and appears to the left on the display. As the transmission cable length increases, the skew effect increases.

The MTPX Plus has a skew equalizer function that is available using SIS, the Matrix Switchers Control Program, or built-in HTML page control. The skew function provides separate time delay circuits on the red, green, and blue video lines on the inputs and the outputs. Each time delay circuit can be independently adjusted, from 0 to 62 nanoseconds, to properly align the red, green, and blue video signals on the displayed image. When correctly set, the red, green, or blue video signal on the shortest wire pair is delayed to properly converge the displayed video image.

UTP cable test equipment measures and reports wire pair length. The report on the various pair lengths can be used to properly equalize pair skew. If UTP cable test measurement cannot be done, pair skew can still be equalized by viewing a test pattern with a critical eye. Examine the test pattern for loss of horizontal registration and, through a process of trial and error, equalize any pair skew.

## Features

**Twisted pair inputs and outputs** — The switchers input and output TP signals on female RJ-45 connectors.

**NOTE:** For low resolution MTPs (S-video and composite video) on the TP inputs, the MTPX Plus audio circuits are compatible only with the newer generation, mono audio models. See your MTP transmitter/ receiver and refer to the associated manual to determine which MTP models you have.

**Local video inputs and outputs** — The switchers directly input and output RGBHV or RGBS (VGA) video on 15-pin HD connectors. They can also input and output RGsB, RsGsBs, component/HDTV, S-video, or composite video.

**Local audio inputs** — The switchers directly input balanced or unbalanced stereo audio on 3.5 mm, 5-pole captive screw terminals.

**Audio input gain/attenuation** — The volume of each audio input can be adjusted so there are no noticeable volume differences between sources. You can set the input level of audio gain or attenuation (-18 dB to +24 dB) via the front panel or via serial port control.

**Audio output volume** — The volume of each audio signal that is output on the 5-pole, 3.5 mm captive screw input connectors can be displayed and adjusted through a range of full output to complete silence. Adjustments can be made from the front panel or remote control.

**Switching flexibility** — The switcher provides individually buffered, independent, matrix switched outputs with audio follow and audio breakaway.

- **Tie any input to any or all outputs.**
- **Quick multiple tie** — Multiple inputs can be switched to multiple outputs simultaneously. This allows all displays (outputs) to change from source to source at the same time.
- **Audio follow** — Audio can be switched with its corresponding video input via front panel control or via serial port remote control.
- **Audio breakaway** — Audio can be broken away from its corresponding video signal. This feature allows any audio signal to be tied to one or all outputs in any combination with or without an accompanying video signal. Audio breakaway switching can be done via front panel control or via serial port remote control.

**Operational flexibility** — Operations such as input/output selection, setting of presets, and adjustment of audio levels can be performed using the front panel or via either serial port. The serial ports allow remote control via a PC or a control system.

- **Front panel controls** — The front panel controls support input and output selection, preset creation and selection, audio gain and attenuation, and volume control. The front panel features slots for labels that can identify each input and output with text or graphics.
- **Matrix Switchers Control Program** — For serial port remote control from a PC, the Extron Windows-based Matrix Switchers Control Program provides a graphical interface and drag-and-drop/point-and-click operation. The Matrix Switchers Control Program also has an emulation mode that lets you create a switcher configuration file at the home office and then download it for use by the switcher on site.
- **Simple Instruction Set (SIS)** — The remote control protocol uses the Extron SIS for easy programming and operation.
- **Remote control panels and keypads** — The matrix switchers are remote controllable, using the optional MKP 2000 and MKP 3000 remote control keypads. These remote control devices are easy to use and provide tactile buttons for quick selection. Each MKP can be used for input-to-output switching or one-touch switching for a particular output. The MKP 3000 also can be used for selection of global presets.

**EDID Minder (MTPX Plus 128 only)** — Captures and stores EDID information, continuously making it available to all local inputs. EDID minder has two operating modes:

- **Automatic (default)** — Captures EDID for displays connected to the local outputs and provides data to the appropriate local inputs.
- **User Assigned Mode** — Rates from EDID table can be selected and assigned to any input. EDID file for the display connected to output 1 can be stored in the EDID table (4 user assigned locations available).

**Upgradeable firmware** — The firmware that controls all switcher operations can be upgraded in the field via either serial port, without taking the switcher out of service. Firmware upgrades are available for download on the Extron website, [www.extron.com](http://www.extron.com), and can be installed using the Matrix Switchers Control Program.

**Labeling** — The Extron button label software is shipped with every Extron matrix switcher. You can create labels to place above the front panel input buttons and below the output buttons, with names, alphanumeric characters, or color bitmaps for easy and intuitive input and output selection. Alternatively, labels can be made with any Brother® P-Touch™ or comparable labeler.

**Global memory presets** — 32 global memory presets are a time-saving feature that lets you set up and store input/output configurations in advance. You can then recall those configurations, when needed, with a few simple steps on the front panel.

**Rack mounting** — The 1U high (MTPX Plus 128), 2U high (other matrix sizes 1616 and smaller), or 3U high (matrix sizes 1632 and larger) enclosure is rack mountable in any conventional 19-inch wide rack. The 2U and 3U enclosures are mountable without extra hardware. The 1U enclosure is rack mountable using the provided mounting kit.

**Three front panel security lockout modes (Executive modes)** — If a matrix switcher is installed in an open area, where operation by unauthorized personnel may be a problem, either of two security lockout modes can be implemented (the third mode is unlocked). When a front panel lockout mode is enabled, a special button combination or SIS command is required to unlock the front panel controls and make the front panel fully operational.

**Power** — The 100 VAC to 240 VAC internal power supply provides worldwide power compatibility.



# Installation

This section details the installation of the MTPX Plus Matrix Switchers, including:

- **Mounting the Switcher**
- **Rear Panel Cabling and Settings**
- **Front Panel Configuration Port**

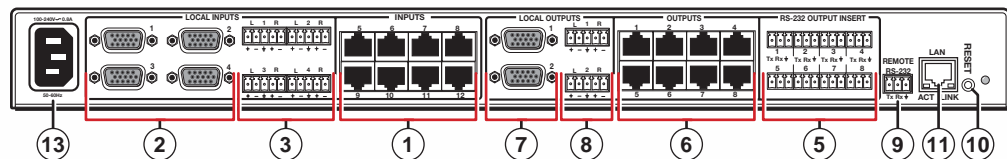
## Mounting the Switcher

**CAUTION:** Installation and service must be performed by authorized personnel only.

**Detailed mounting instructions** can be found in the “Reference Information” section at the end of this guide. The MTPX Plus switchers are housed in a 1U high (MTPX Plus 128), 2U high (other matrix sizes 1616 and smaller), or 3U high (matrix sizes 1632 and larger) metal enclosures. The 1U enclosure is rack mountable using the provided MBD 149 Through-desk and rack mounting kit (part number **70-077-03**). The 2U and 3U enclosures are mountable without extra hardware.

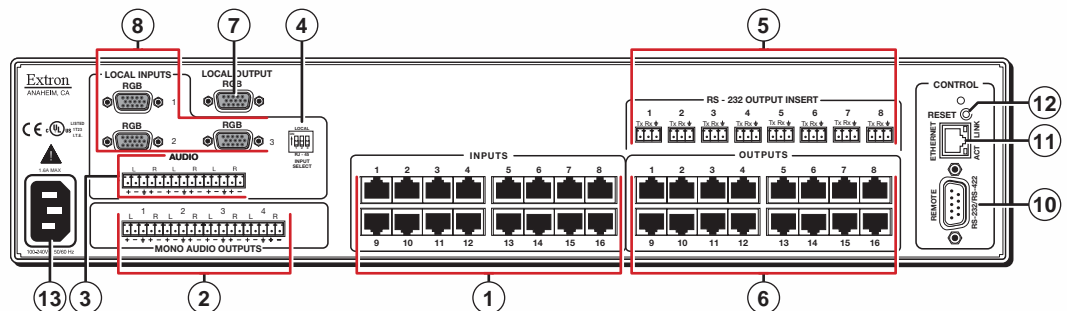
## Rear Panel Cabling and Settings

Figure 2 shows the rear panel of the MTPX Plus 128.



**Figure 2.** MTPX Plus 128 Twisted Pair Matrix Switcher

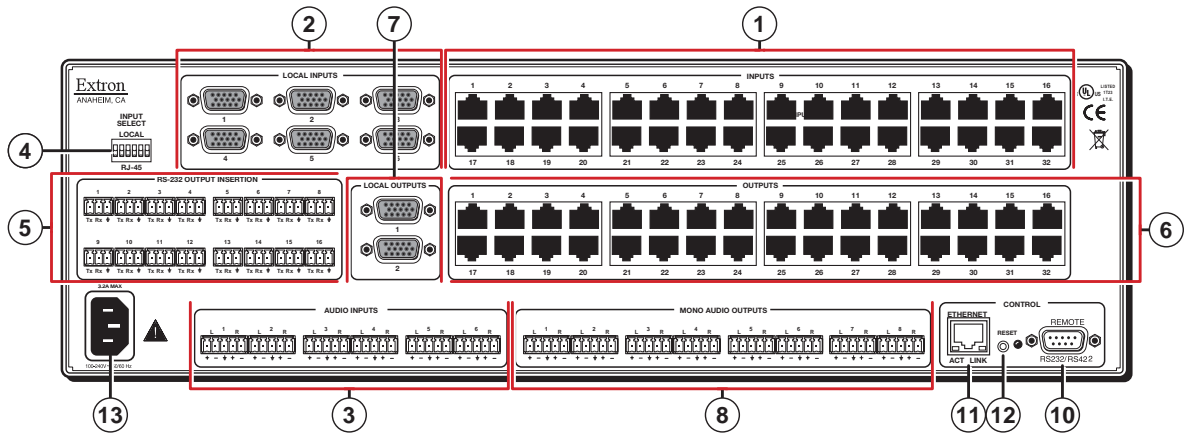
Figure 3 shows the rear panel of the MTPX Plus 1616.



**Figure 3.** MTPX Plus 1616 Twisted Pair Matrix Switcher

**NOTE:** The MTPX Plus 816 and MTPX Plus 168 are housed in the same 2U enclosure, but have fewer input connectors (8 x 16 matrix) or output connectors (16 x 8 matrix) to accommodate their smaller matrix sizes.

Figure 4 shows the rear panel of the MTPX Plus 3232.



**Figure 4.** MTPX Plus 3232 Twisted Pair Matrix Switcher

**NOTE:** The MTPX Plus 1632 and MTPX Plus 3216 are housed in the same 3U enclosure, but have fewer input connectors (16 x 32 matrix) or output connectors (32 x 16 matrix) to accommodate their smaller matrix sizes.

**CAUTIONS:**

- Use Electrostatic discharge (ESD) precautions (that is, be electrically grounded) when making connections. Electrostatic discharge can damage equipment, even if you cannot feel, see, or hear it.
- Remove system power before making any connections.

## Signal Inputs

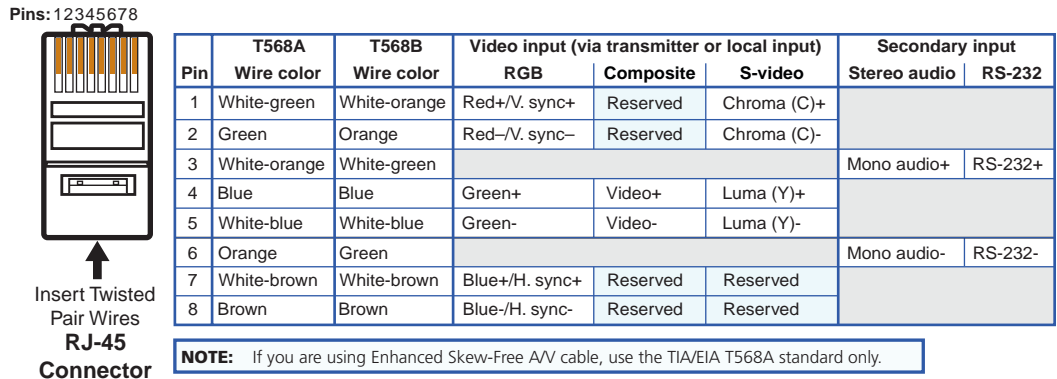
① **Inputs (TP) connectors** — Connect the TP outputs of compatible MTP or VTT transmitters to these RJ-45 female connectors.

**CAUTION:** Do not connect this device to a computer data or telecommunications network.

**NOTES:**

- Configure the switcher for the appropriate content on the audio/RS-232 wire pair (pins 3 and 6) for each TP input (see “**Defining the Audio/RS-232 Wire Pair**” in the “Operation” section). You can also use SIS commands (see the “**Programming Guide**” section), the Matrix Switchers Control Program (see the “**Matrix Software**” section), or the HTML pages (see the “**HTML Operation**” section).
- For best results, use a minimum cable length of at least 25 feet (7.5 m) between the transmitter and the MTPX input and between the MTPX output and the transmitter.
- RJ-45 termination with CAT 5, CAT 5e, or CAT 6 cable must comply with the TIA/EIA T568A or TIA/EIA T568B wiring standards for all connections. RJ-45 termination with Enhanced Skew-Free A/V UTP cable must comply with TIA/EIA T568A only.
- For low resolution MTPs (S-video and composite video) on the TP inputs, the MTPX Plus audio circuits are compatible only with the newer generation, mono audio models. See your MTP transmitter/ receiver and refer to the associated manual to determine which MTP models you have.

Figure 5 shows the recommended termination of TP cables in accordance with the TIA/EIA T568A or TIA/EIA T568B wiring standards. You can use either standard with CAT 5, 5e, or 6 cable, but use the same standard on both ends of the cable.



**Figure 5. TP Cable Termination**

**NOTE:** Enhanced Skew-free A/V cable is not recommended for Ethernet/LAN applications. This cable is specially designed for compatibility with the Extron Twisted Pair products that are wired using the TIA/EIA 568A standard.

The green, brown, and blue pairs of this cable have virtually identical lengths and should be used to transmit the RGB signals.

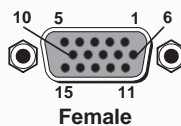
The orange pair of this cable has a different length and should not be used to transmit the RGB signals..

② **Local Inputs (VGA) connectors** — Connect analog computer-video (RGB) sources to these 15-pin HD female connectors.



**NOTES:**

- The video that is input on this connector, when it is tied to a TP output, is converted to same type of the proprietary TP signal that is output by the MTP 15HD transmitters. This allows you to eliminate some of the transmitters in your system.
- When either the input or output of a tie is local (VGA), Extron recommends that the MTP output or input be connected by a minimum of 25 feet (7.5 m) of TP cable to prevent overpeaking.
- The matrix switchers can also input and switch HD component video, component video, S-video, or composite video by using the appropriate adapters and the pins show in figure 6. No configuration of the switcher is required for component or other non-RGB video formats.



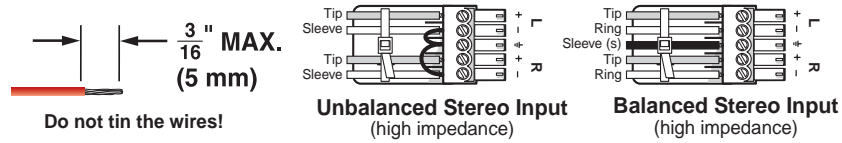
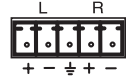
Pin	Component Signal	S-video Signal	Composite Signal
1	R-Y	Chroma (C)	Video 2*
2	Y	Luma (Y)	Video
3	B-Y		Video 3*
4-5			
6	R-Y return	Chroma return	Video 2 return*
7	Y return	Luma return	Video return
8	B-Y return		Video 3 return*
9-15			

\* You can input and output additional, genlocked, composite video on these pins.

**NOTE:** Input only sync signals, no video signals, on the sync pins (13 and 14).

**Figure 6. Other Video Formats on a VGA Connector**

- ③ **Audio Inputs (local audio) connectors** — Connect balanced or unbalanced stereo audio inputs to these 3.5 mm, 5-pole captive screw connectors. Connectors are included with each switcher, but you must supply the audio cable. See figure 7 to wire a connector for the appropriate input type and impedance level. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector. High impedance is generally over 800 ohms.

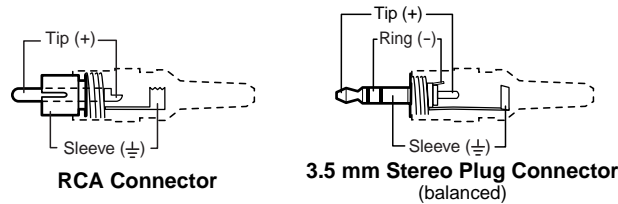


**Figure 7. Captive Screw Connector Wiring for Audio Inputs**

**CAUTIONS:**

- The length of exposed wires is critical. The ideal length is 3/16 inch (5 mm).
  - If the stripped section of wire is longer than 3/16 inch, the exposed wires may touch, causing a short circuit.
  - If the stripped section of wire is shorter than 3/16 inch, wires can be easily pulled out even if tightly fastened by the captive screws.
- The captive screw audio connector can easily be inadvertently plugged partially into one receptacle and partially into an adjacent receptacle. This misconnection could damage the audio output circuits. Ensure that the connector is plugged fully and only into the desired input or output.

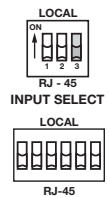
A mono audio connector consists of a tip and sleeve. A stereo audio connector consists of a tip, ring and sleeve. See figure 8 to identify the tip, ring, and sleeve parts of the connector when you are making connections for the switcher from existing audio cables. The ring, tip, and sleeve wires are also shown on the captive screw audio connector diagrams, figure 7 and figure 10.



**Figure 8. Typical Audio Connectors**

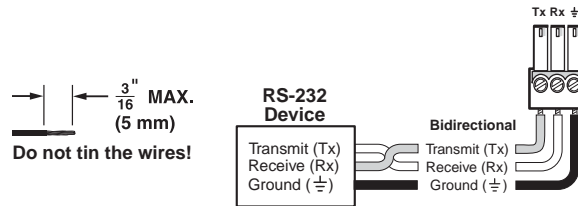
The audio level for each input can be individually set via the front panel or remote control to ensure that the level on the output does not vary from input to input (see “**Viewing and Adjusting the Input Audio Level**” in the “Operation” section). You can also use SIS commands (see the “**Programming Guide**” section), the Matrix Switchers Control Program (see the “**Matrix Software**” section), or the HTML pages (see the “**HTML Operation**” section).

- ④ **Input Select switches (switchers other than the MTPX Plus 128)** — For inputs 1 through 3 (matrix sizes 1616 and smaller, excluding the MTPX Plus 128) or inputs 1 through 6 (matrix sizes 1632 and larger), set these DIP switches to the Local (up) position to select the local (RGB video and audio) input. Set the DIP switches to the RJ-45 (down) position to select the MTP input.



## RS-232 Output Inserts

- ⑤ **RS-232 Output Insert connectors** — For bidirectional RS-232 data that is routed to a specific (unswitchable) TP output, connect a serial device to one of these 3.5 mm, 3-pole captive screw connectors. Figure 9 shows how to wire the connectors.



**Figure 9.** RS-232 Output Insert Wiring

**CAUTION:** The length of exposed wires is critical (see the **CAUTIONS** on page 14 for details).

For the RS-232 Output Insert to be available on the TP output, the insert must be enabled via an SIS command (see the “**Programming Guide**” section), the Matrix Switchers Control Program (see the “**Matrix Software**” section), or an MTPX Plus HTML page (see the “**HTML Operation**” section).

Each RS-232 output insertion is dedicated to the output with that number; for example, RS-232 Output Insert 1 is always routed to the Output 1 TP connector (when enabled as described in the note above), RS-232 Output Insert 2 is routed to the Output 2 TP connector, and so on.

- NOTES:**
- When an RS-232 output insert is enabled, any content on the audio/RS-232 wire pair for the TP input tied to that output is disabled.
  - The switch time for the RS-232 output insert is 50 ms.

## Signal Outputs

- ⑥ **Outputs (MTP) connectors** — Connect the TP inputs of compatible MTP or VTR receivers to these RJ-45 female connectors.

See the Inputs connector (item ①) in the “Signal inputs” section, for detailed pin assignments for the RJ-45 connectors.

**CAUTION:** Do not connect this device to a computer data or telecommunications network.

**NOTE:** For best results, use a cable length of at least 25 feet (7.5 m) between the TP output connector and the receiver.

- ⑦ **Local Outputs (VGA) connector(s)** — Connect one or two RGBHV video displays to these 15-pin HD female connectors for each output.

Matrix sizes 1616 and smaller (excluding the MTPX Plus 128) have one local video output.

Matrix sizes 1632 and larger and the MTPX Plus 128 have two local video outputs.

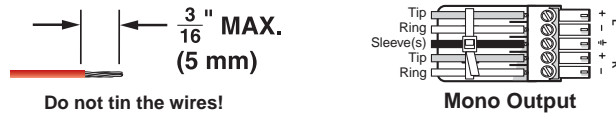
These outputs are always outputs 1 and 2, with the same inputs tied to them as to TP outputs 1 and 2.

**NOTES:**

- The video that is output on this (these) connector(s) is converted from the tied proprietary TP input signal or the local (VGA) input. This feature allows you duplicates of output(s) 1 (and 2) while eliminating the need for extra receivers.
- When either the output or input of a tie is local (VGA), Extron recommends that the MTP input or output be connected by a minimum of 25 feet (7.5 m) of TP cable to prevent overpeaking.
- This connector can also output HD component video, component video, S-video, or composite video, using the appropriate adapters, if that is the video format that was input. See **figure 6** on page 13 to identify the pins to use for the various video formats. Also, set the output to no sync processing (see the **Local video output sync polarity** SIS commands on page 83).



- ⑧ **Mono Audio (local audio) outputs** — Connect audio devices, such as an audio amplifier or powered speakers, to these four or eight 3.5 mm, 5-pole captive screw connectors. These connectors output the selected unamplified, mono line level audio. See figure 10 to wire an output connector. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector.



**Figure 10. Captive Screw Connector Wiring for Audio Output**

**CAUTIONS:**

- For unbalanced audio, connect the sleeves to the ground contact. **DO NOT** connect the sleeves to the negative (-) contacts.
- The length of exposed wires is critical (see the **CAUTIONS** on page 14 for details).

Matrix sizes 1616 and smaller have four local audio outputs.  
 Matrix sizes 1632 and larger have eight local audio outputs.

These outputs are always outputs 1 through 4 (or 8), with the same inputs tied to them as to TP outputs 1 through 4 (or 8).

**NOTES:**

- The audio that is output on this (these) connector(s) is converted from the tied proprietary TP input signal or the local audio input. This feature allows you duplicates of the outputs while eliminating the need for extra receivers.
- When an input that is configured as RS-232 is switched to a local audio output, the output is muted to prevent RS-232 noise on the audio output.

The volume level for each local output can be individually set via the front panel or remote control (see the “**Operation**” section, the “**Programming Guide**” section, the “**Matrix Software**” section, and the “**HTML Operation**” section).

By default, the audio ties follow the video ties. Audio breakaway, which can be activated via the front panel or under remote control, allows you to select from any one of the audio input sources and route it separately from its corresponding video source (see the “**Operation**” section, the “**Programming Guide**” section, the “**Matrix Software**” section, and the “**HTML Operation**” section).

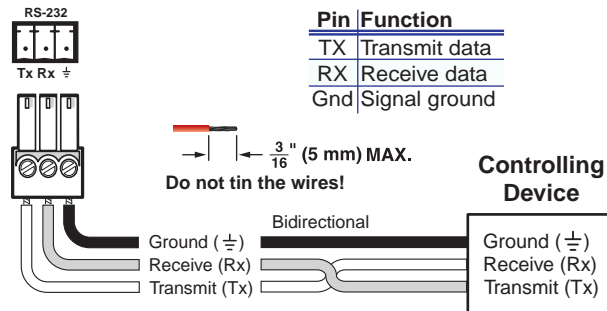
## Remote Connection

Connect a host device, such as a computer, touch panel control, or RS-232 capable PDA to the switcher via the remote port of your switcher.

**NOTE:** The port can operate at 9600, 19200, 38400, or 115200 baud rates. Models other than the MTPX Plus 128 can support either the RS-232 or RS-422 serial communication protocol (see “[Selecting the Rear Panel Remote Port Protocol and Baud Rate](#)” in the “Operation” section to configure the Remote port from the front panel).

If desired, connect an MKP 2000 or MKP 3000 remote control panel to the Remote connector of the switcher. Refer to the *MKP 2000 Remote Control Panel User Guide* or the *MKP 3000 Remote Control Panel User Guide* for details.

- ⑨ **Remote (RS-232) connector (MTPX Plus 128)** — A 3-pin captive screw connector for serial RS-232 control (see figure 11). Use the supplied tie-wrap to strap the serial cable to the extended tail of the connector.



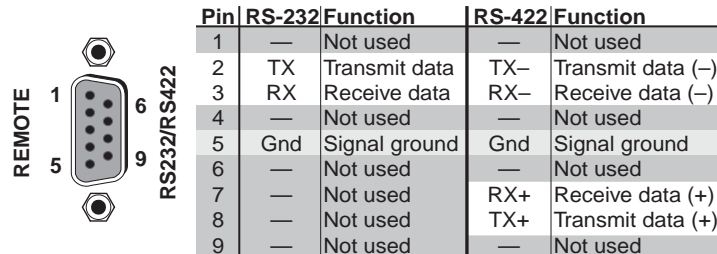
**NOTE:** Cross the Tx and Rx lines once between the source and the target.

**Figure 11.** MTPX Plus 128 Remote Connector

**CAUTION:** The length of exposed wires is critical (see the [CAUTIONS](#) on page 14 for details).

**NOTE:** This port is hardwired for RS-232 only.

- ⑩ **Remote connector (all other models)** — A 9-pin D connector for serial RS-232 or RS-422 control (see figure 12).



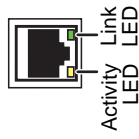
**Figure 12.** Remote Connector for all Other Models

See the “[Programming Guide](#)” section for definitions of the SIS commands (ASCII commands to control the switcher via this connector) and the “[Matrix Software](#)” section for details on how to install and use the control software.

## Ethernet Connection

**NOTE:** This port and TP cable carries control signals, **not** the video, audio, serial signals carried by the RJ-45 (item ①).

- ① **LAN port** — If desired, for IP control of the switcher, connect the switcher to a PC or to an Ethernet LAN via this RJ-45 connector. You can use a PC to control the networked switcher with SIS commands from anywhere in the world. You can also control the switcher from a PC that is running the Extron Matrix Switchers Control Program or has downloaded HTML pages from the switcher.



**Ethernet connection indicators** — The Link and Activity LEDs indicate the status of the Ethernet connection. The Link LED indicates that the switcher is properly connected to an Ethernet LAN. This LED should light steadily. The Activity LED indicates transmission of data packets on the RJ-45 connector. This LED should flicker as the switcher communicates.

## Cabling

It is vital that your Ethernet cables be the correct cable type, and that they be properly terminated. Ethernet links use Category (CAT) 5e or CAT 6, unshielded twisted pair (UTP) or shielded twisted pair (STP) cables, terminated with RJ-45 connectors. Ethernet cables are limited to a length of 328 feet (100 m).

- NOTES:**
- Do not use standard telephone cables. Telephone cables do not support Ethernet or Fast Ethernet.
  - Do not stretch or bend cables. Transmission errors can occur.

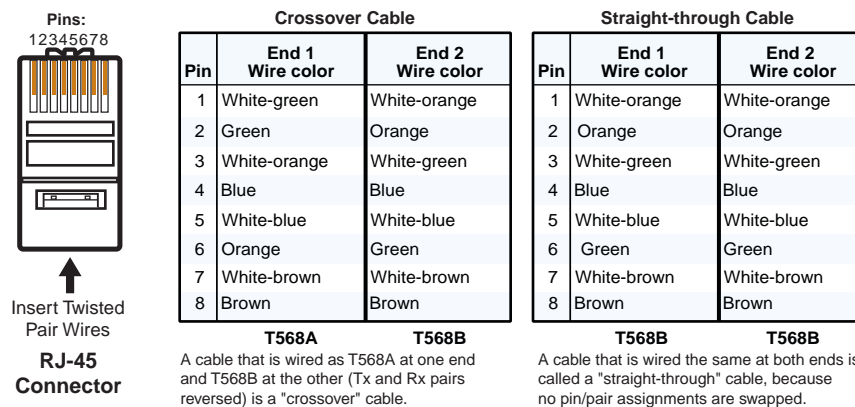
The cable used depends on your network speed. The switcher supports both 10 Mbps (10Base-T — Ethernet) and 100 Mbps (100Base-T — Fast Ethernet), half-duplex and full-duplex Ethernet connections.

- 10Base-T Ethernet requires CAT 3 UTP or STP cable at minimum.
- 100Base-T Fast Ethernet requires CAT 5e UTP or STP cable at minimum.

## RJ-45 connector wiring

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (see figure 13).

- **Crossover cable** — Direct connection between the computer and the switcher
- **Patch (straight) cable** — Connection of the MTPX Plus switcher to an Ethernet LAN



**Figure 13. RJ-45 Connector and Pinout Tables**

## Reset Button

- ⑫ **Reset button** — The Reset button initiates two levels of reset to the matrix switcher. For two different reset levels, press and hold the button while the switcher is running or while you power up the switcher.



See “**Rear Panel Operations**” in the “Operation” section for details.

- **Rear panel (mode 5) system reset** — Press and hold the Reset button until the Reset LED blinks three times (approximately 9 seconds), then release the button and push it again. This reset clears all ties and presets and resets all audio gains to 0 dB.
- **Hard reset** — Press and hold the Reset button while powering up the switcher to perform all of the mode 5 reset functions and restore the switcher to the default factory conditions.

**NOTE:** Hard reset does not clear the current configuration.

## Power Connection

- ⑬ **AC power connector** — Plug a standard IEC power cord into this connector to connect the switcher to a 100 VAC to 240 VAC, 50 or 60 Hz power source.

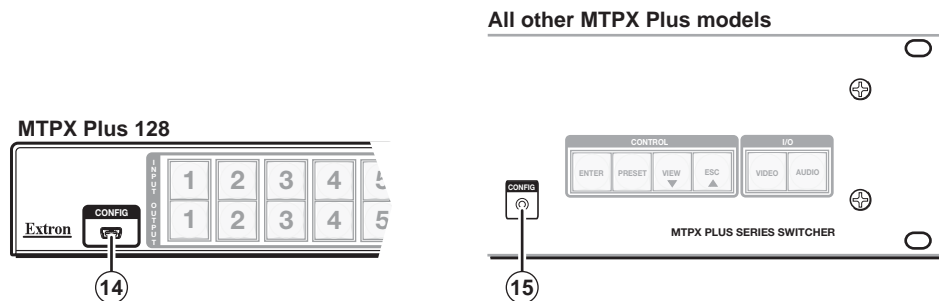
**WARNING:** The power connector is wired double pole with neutral fusing.

## Front Panel Configuration Port

This front panel configuration port serves a similar communications function as the rear panel Remote port, but it is easier to access than the rear port after the matrix switcher has been installed and cabled.

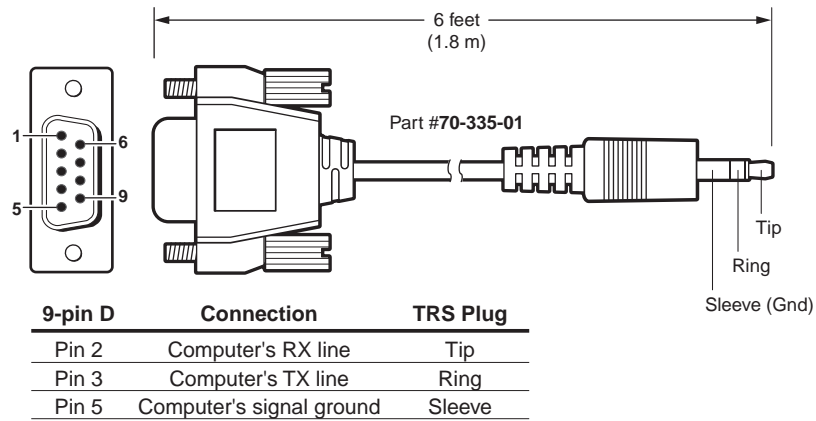
- NOTES:**
- The Configuration port is independent of the rear panel Remote port and is not affected by changes to the protocol of the rear panel port.
  - A front panel Configuration port connection and a rear panel Remote port connection can both be active at the same time.

Figure 14 shows the Configuration port for the various MTPX Plus models.



**Figure 14.** Front Panel Configuration Port

- ⑭ **Configuration port (MTPX Plus 128 only)** — A mini USB B port.
- ⑮ **Configuration port** — A 2.5 mm mini stereo jack. The optional 9-pin D to 2.5 mm mini jack TRS RS-232 cable, part number **70-335-01** (see **figure 15**, on the next page), can be used for this connection.



**Figure 15. Optional 9-pin TRS RS-232 cable**

**NOTE:** The stereo jack Configuration port (item ⑤) protocol can be changed under SIS command control only (see the **Set serial port parameters** SIS Command, in the "Programming Guide" section to configure all ports under SIS control).

This port is RS-232 only, with its default protocols as follows:

- 9600 baud
- no parity
- 8 data bits
- 1 stop bit
- no flow control

**NOTE:** The maximum distances from the matrix switcher to the controlling device can vary up to 200 feet (61 m). Factors such as cable gauge, baud rates, environment, and output levels (from the switcher and the controlling device) all affect transmission distance. Distances of about 50 feet (15 m) are typically not a problem. In some cases the matrix switcher may be capable of serial communications via RS-232 up to 250 feet (76 m) away.

# Operation

This section describes the front panel operation of the MTPX Plus Matrix Switcher, including:

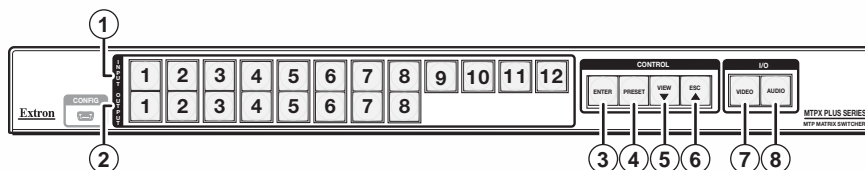
- **Front Panel Controls and Indicators**
- **Front Panel Operations**
- **Rear Panel Operations**
- **Optimizing the Audio**
- **Video Adjustments**
- **Troubleshooting**
- **Configuration Worksheets**

## Front Panel Controls and Indicators

The front panel controls (see **figure 16** through **figure 18**) are grouped into two sets. The input and output buttons, ① and ②, are grouped on the left side of the control panel. The control buttons and video/audio (I/O) selection buttons, ③ through ⑧, are grouped on the right side of the panel.

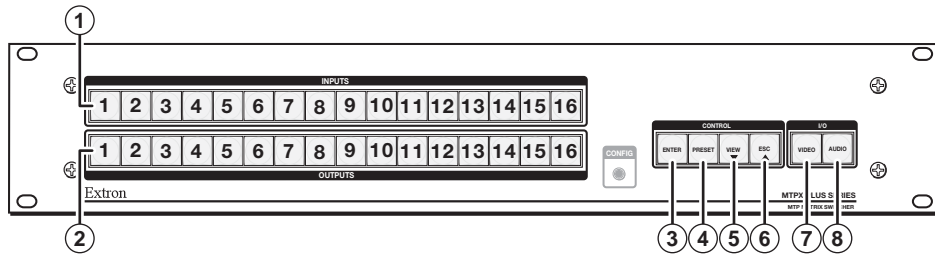
- NOTES:**
- While the number of inputs and outputs varies, depending on the size of the matrix, there are only three front panel arrangements:
    - 12 input buttons by 8 output buttons (see **figure 16**)
    - 16 input buttons by 16 output buttons (see **figure 17**)
    - 32 input buttons by 32 output buttons (see **figure 18**)
  - On smaller matrix switchers, the larger-numbered buttons are not used for input and output selection, although they are used to select and indicate preset numbers, indicate the input audio level, and indicate the output audio volume.

The illuminated pushbuttons can be labeled with text, graphics, or both. The buttons can be set to provide amber background illumination all the time, or the background illumination can be turned off (see “**Background Illumination**”, on page 61). The buttons blink or are lit at full intensity (depending on the operation) when selected.

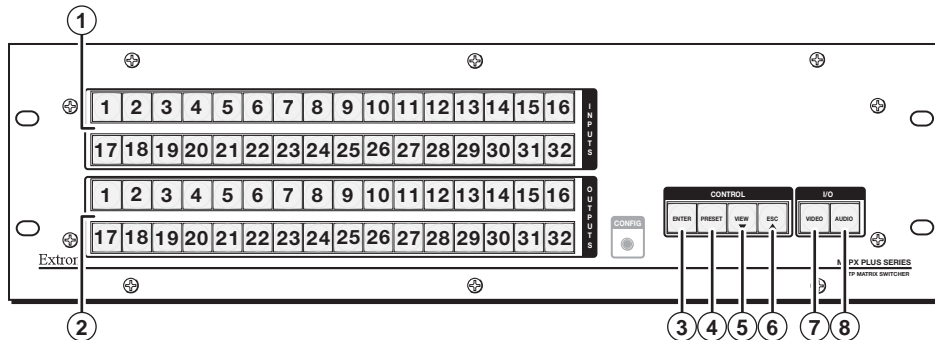


**Figure 16.** Front Panel, MTPX Plus 128





**Figure 17.** Front Panel, MTPX Plus 816, 168, 1616



**Figure 18.** Front Panel, MTPX Plus 1632, 3216, 3232

**NOTES:**

- Input and output buttons cannot select an input number or output number that is higher than your matrix size supports. Buttons numbered higher than your matrix size do have other functions as described in the following pages.
- See “**Front Panel Operations**” for detailed descriptions of the following operations.

- ① **Input buttons** — See [page 25](#).
- ② **Output buttons** — See [page 25](#).
- ③ **Enter button** — See [page 26](#).
- ④ **Preset button** — See [page 27](#).
- ⑤ **View button** — See [page 27](#).
- ⑥ **Esc button** — See [page 27](#).
- ⑦ **Video button** — See [page 28](#).
- ⑧ **Audio button** — See [page 28](#).

## Input and Output Buttons

**NOTE:** See “**Front Panel Operations**” for detailed descriptions of the following operations.

Primary functions		
	Action	Select input or output for tie being created.
	Indication	<i>Blink:</i> potential tie/untie. <i>Lit:</i> current tie <i>Amber:</i> video and audio tie <i>Green:</i> video only tie <i>Red:</i> audio only tie
		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 10px; text-align: center; width: 40px; height: 40px; margin: 5px;">1</div> <div style="border: 1px solid black; padding: 10px; text-align: center; width: 40px; height: 40px; margin: 5px;">2</div> <div style="border: 1px solid black; padding: 10px; text-align: center; width: 40px; height: 40px; margin: 5px;">3</div> </div> through {highest numbered input or output button}
Secondary functions		
I/O grouping	Action 1	Input 1 and Output 1: Select I/O Group mode.
	Action 2	Assign an input or output to the selected group.
	Indication	<i>Lit:</i> Input or output is assigned to the selected group.
Presets	Action	Select a preset in <i>Preset</i> mode.
	Indication	<i>Lit:</i> A preset has already been saved to this location. <i>Blink:</i> Preset location is selected to be saved.
Input audio level	Action	<b>Input buttons:</b> Select the input for audio gain or attenuation adjustment.
	Indication	<b>Input buttons lit:</b> Input audio selected for adjustment.
	Indication	<b>Output buttons lit or blinking:</b> Indicate the input gain or attenuation level.
Output audio volume	Action	<b>Output buttons:</b> Select the output for audio volume adjustment.
	Indication	<b>Output buttons lit:</b> Output audio is selected for adjustment.
	Indication	<b>Input buttons lit or blinking:</b> Indicated the output volume level.
Audio or RS-232 mutes	Action	<b>Output buttons:</b> Press and hold to mute or unmute the audio or RS-232 output.
	Indication	<b>Output buttons blinking:</b> Output audio or RS-232 is muted.
Input configuration	Action	<b>Input buttons:</b> Toggle between audio or RS-232 as the pins 3 and 6 input.
	Indication	<b>Input buttons lit:</b> RS-232 <i>Unlit:</i> audio
Background illumination	Action	<b>Input 1 and Input 2 buttons:</b> Toggle between background illumination or buttons unlit.

① **Input buttons** — The input buttons have one primary function (□) and six secondary functions (•):





- Select and identify an input.
- **(Input 1 only)** With the Output 1 button, select I/O Group mode.
- Assign an input to the selected group in I/O Group mode and indicate its assignment.
- Select a preset.
- Display the output volume level.
- Select and identify the audio/RS-232 wire pair as audio (unlit) or RS-232 (lit) in *Serial Port and Audio/RS-232 Input Configuration* mode.
- (Input 1 and Input 2 only) Toggle background illumination of the buttons on and off.

② **Output buttons** — The output buttons have one primary function (□) and five secondary functions (•):

- Select and identify an output.
- **(Output 1 only)** With the Input 1 button, select I/O Group mode.
- Assign an output to the selected group in I/O Group mode and indicate its assignment.
- Select a preset.
- Mute the audio or RS-232 output..
- Display the audio level of the selected input.

## Control Buttons and LEDs

**NOTE:** See “[Front Panel Operations](#)” for detailed descriptions of the following operations.

Primary functions					
	Action	Save changes	Select <i>Preset</i> mode	Select <i>View</i> mode	Cancel/Escape
	Indication	<i>Blink</i> : Save needed	<i>Blink</i> : Save preset <i>Lit</i> : Recall preset	View mode selected	Flashes once
					
Secondary functions					
I/O grouping	Action/indication	Select and indicate group 1	Select and indicate group 2	Select and indicate group 3	Select and indicate group 4
Port and input configuration	Action 1	Select <i>Configuration</i> mode.			
	Action 2	Select 9600 baud	Select 19200 baud	Select 38400 baud	Select 115200 baud
	Indication	<i>Blink</i> : 9600 baud	<i>Blink</i> : 19200 baud	<i>Blink</i> : 38400 baud	<i>Blink</i> : 115200 baud
Front panel locks	Action	With Video and Audio, select <i>Lock</i> mode 2 or toggle between mode 0 and mode 0.			
Audio	Action			In <i>Audio</i> mode, decrease <b>input level</b> or <b>output volume</b> .	In <i>Audio</i> mode, increase <b>input level</b> or <b>output volume</b> .

- ③ **Enter button** — The Enter button has two primary functions (□) and four secondary functions (●):
- Saves configuration or preset changes that you make on the front panel. To create a simple configuration:
    - Specify video, audio, or both (see I/O buttons [item ⑦] and [item ⑧]).
    - Press the desired input button (item ①).
    - Press the desired output button or buttons (item ②).
    - Press the Enter button.
  - Indicates that a potential tie has been created but not saved.
    - In the *I/O Group* mode, selects group 1 and indicates the selection.
    - With the Preset, View, and Esc buttons, selects *Serial Port and Audio/RS-232 Input Configuration* mode.
    - Selects 9600 baud for the rear panel Remote port in *Serial Port and Audio/RS-232 Input Configuration* mode and indicates the selection.
    - With the Video and Audio buttons, selects front panel security *Lock* mode 2 or toggles between mode 0 (unlocked) and mode 2.

- ④ **Preset button** — The Preset button has two primary functions (□) and three secondary functions (•):
- Activates *Save Preset* mode to save a configuration as a preset and *Recall Preset* mode to activate a previously-defined preset.
  - Blinks when *Save Preset* mode is active and lights steadily when *Recall Preset* mode is active.
    - In the *I/O Group* mode, selects group 2 and indicates the selection.
    - With the Enter, View, and Esc buttons, selects *Serial Port and Audio/RS-232 Input Configuration* mode.
    - Selects 19200 baud for the rear panel Remote port in *Serial Port and Audio/RS-232 Input Configuration* mode and indicates the selection.
- ⑤ **View (▼) button** — The View (▼) button has one primary function (□) and five secondary functions (•):
- Select and indicate View-only mode, which displays the current configuration.
 

**NOTE:** View-only mode also provides a way to mute and unmute the audio or RS-232 outputs.



    - In the *I/O Group* mode, selects group 3 and indicates the selection.
    - Decreases the audio level of the selected input.
    - Decreases the volume of the selected output.
    - With the Enter, Preset, and Esc buttons, selects *Serial Port and Audio/RS-232 Input Configuration* mode.
    - Selects 38400 baud for the rear panel Remote port in *Serial Port and Audio/RS-232 Input Configuration* mode, and indicates the selection.
- ⑥ **Esc (▲) button** — The Esc (▲) button has two primary functions (□) and five secondary functions (•):
- Cancels operations or selections in progress and resets the front panel button indicators.
 

**NOTE:** The Esc (▲) button does not reset the current configuration, the Video button and Audio selection button, any presets, or any audio gain or attenuation or volume settings.

    - Flashes once to indicate that the escape function has been activated.
      - In the *I/O Group* mode, selects group 4 and indicates the selection.
      - Increases the audio level of the selected input.
      - Increases the volume of the selected output.
      - With the Enter, Preset, and View buttons, selects *Serial Port and Audio/RS-232 Input Configuration* mode.
      - Selects 115200 baud for the rear panel Remote port in *Serial Port and Audio/RS-232 Input Configuration* mode and indicates the selection.

## I/O Controls

**NOTE:** See “**Front Panel Operations**” for detailed descriptions of the following operations.

Primary functions			
	<u>Action</u>	Select video	Select audio
	Indication	<i>Green</i> : selected	<i>Red</i> : selected
			
Secondary functions			
Front panel locks	Action 1	With Enter, select <i>Lock</i> mode 2 or toggle between mode 0 and mode 2.	
	Action 2	Select <i>Lock</i> mode 1 or toggle between mode 2 and mode 1.	
Resets	Action 1:	Perform a system reset.	
Port Configuration	<u>Action</u>	Select RS-232.	Select RS-422
	Indication	<i>Blink</i> : selected	<i>Blink</i> : selected
Audio	Action		Select <i>Audio</i> mode.

⑦ **Video button** — The Video button has one primary function (□) and four secondary functions (●):

- Selects and deselects video for a configuration that is being created or viewed and lights green to indicate that video is available for configuring or for viewing.
- With the Enter button and Audio button, selects between front panel locks (*Lock* mode 2 and *Lock* mode 0).
- With the Audio button, selects between front panel locks (*Lock* mode 2 and *Lock* mode 1).
- With the Audio button, commands the front panel system reset.
- **Switchers other than MTPX Plus 128** — Selects the RS-232 protocol for the rear panel Remote port in *Serial Port and Audio/RS-232 Input Configuration* mode and indicates the selection.

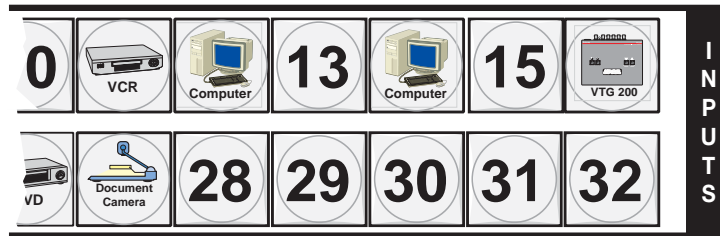
⑧ **Audio button** — The Audio button has one primary function (□) and five secondary functions (●):

- Selects and deselects audio for a configuration that is being created or viewed and lights to indicate that audio is available for configuration or viewing.
- Selects the *Audio* mode, in which you can adjust the input audio level and the output audio volume.
- With the Enter button and Video button, selects between front panel locks (*Lock* mode 2 and *Lock* mode 0)
- With the Video button, selects between front panel locks (*Lock* mode 2 and *Lock* mode 1).
- With the Video button, commands the front panel system reset.
- **Switchers other than MTPX Plus 128** — Selects the RS-422 protocol for the rear panel Remote port in *Serial Port and Audio/RS-232 Input Configuration* mode and indicates the selection.

## Button Icons

The numbered translucent covers on the input and output pushbuttons can be removed and replaced to insert labels behind the covers.

Input and output labels can be created easily with the Extron Button-Label Generator software, which is shipped with every Extron matrix switcher. Each input and output can be labeled with names, alphanumeric characters, or color bitmaps for easy and intuitive input and output selection (see figure 19). See the “**Matrix Software**” section for details on using the labeling software and the “**Reference Information**” section for blank labels and a procedure for removing and replacing the translucent covers.



**Figure 19.** Sample Button Icons

## Front Panel Operations

The following sections detail the power-up process and then provide sample procedures for the following actions:

- **Creating ties, sets of ties, and configurations**
- **Changing a configuration**
- **Viewing ties, sets of ties, and configurations**
- **Creating I/O groups**
- **Saving a preset**
- **Recalling a preset**
- **Muting and unmuting outputs**
- **Viewing and Adjusting the Input Audio Level**
- **Viewing and Adjusting the Local Output Volume**
- **Locking and unlocking the front panel**
- **Performing front panel resets**
- **Toggling background illumination on and off**
- **Defining the Audio/RS-232 Wire Pair**
- **Reading and setting the Remote port settings**



## Definitions

The following Extron matrix switcher terms are used throughout this manual:

**Tie** — An input-to-output connection

**Set of ties** — An input tied to two or more outputs.

**NOTE:** An output can never be tied to more than one input.

**Configuration** — One or more ties or one or more sets of ties

**Current configuration** — The configuration that is currently active in the switcher (also called configuration 0)

**Global memory preset** — A configuration that has been stored. Up to 32 global memory presets can be stored in memory. Preset locations are assigned to the input buttons and (where necessary) output buttons. When a preset is retrieved from memory, it becomes the current configuration.

All models have 32 presets. On the MTPX 128 Plus, which has fewer than 32 input and output buttons, preset numbers that are too high to be available from the front panel are still accessible under remote or Ethernet control.

**Room** — A subset of outputs that are logically related to each other, as determined by the operator. The switchers support up to 10 rooms, each of which can consist of from 1 to 16 outputs.

**Room memory preset** — A configuration consisting of outputs in a single room that has been stored. When a room preset is retrieved from memory, it becomes the current configuration.

## Power

Apply power by connecting the power cord between the switcher and an AC source. The switcher performs a self-test that flashes the front panel button indicators red, green, and amber and then turns them off. An error-free power-up self-test sequence leaves all input, output, and control buttons either unlit or showing background illumination and the Video button and the Audio button lit.

The current configuration and all presets are saved in non-volatile memory. When power is applied, the most recent configuration is retrieved. The previous presets remain intact.

If an error occurs during the self-test, the switcher locks up and does not operate. If your switcher locks up on power-up, call the Extron S3 Sales and Technical Support Hotline. See the **end** of this guide for the phone number in your region of the world.

## Front Panel Security Lockouts

In the procedural descriptions that follow, it is assumed that the switcher is in *Lock* mode 0 (fully unlocked). The following two *Lock* modes are also available:

- *Lock* mode 1 — All changes are locked from the front panel (except for setting *Lock* mode 2). Some functions can be viewed.
- *Lock* mode 2 — Advanced features are locked and can be viewed only. Basic functions are unlocked.

**NOTE:** The switcher is shipped from the factory in *Lock* mode 2. See “**Setting the Front Panel Locks (Executive Modes)**” on page 59 for a detailed list of basic and advanced functions and the procedure to set the various front panel locks.

## Creating a Configuration

The current configuration can be changed using the front panel buttons. Change the current configuration as follows:

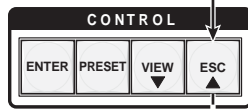
1. Press the Esc button to clear any input button indicators, output button indicators, or control button indicators that may be lit.
2. Select video, audio, or both for configuration by pressing the Video button and Audio button as necessary.
3. Select the desired input and output(s) by pressing the input and output buttons.
  - Input buttons and output buttons light or blink:
    - **Amber** to indicate video and audio ties
    - **Green** to indicate video only ties
    - **Red** to indicate audio only ties
  - To indicate potential ties, output buttons blink the appropriate color when an input is selected.
  - To indicate current ties, output buttons light steadily the appropriate color when an input is selected.
  - To clear unwanted outputs, press and release the associated lit output buttons. To indicate potential unties, output buttons blink the appropriate color when an output is deselected but not untied from the input.
4. Press and release the Enter button to accept the tie or to break an existing tie.
5. Repeat steps 1 through 4 to create or clear additional ties until the desired configuration is complete.

- NOTES:**
- Only one video input and one audio input can be tied to an output.
  - If a tie is made between an input and an output, and the selected output was previously tied to another input, the older tie is broken in favor of the newer tie.
  - If an input with no tie is selected, only the button for the selected input lights.
  - When the Video button and the Audio button are lit, if an input with an audio tie but no video tie is selected, the button for the input and the button for the output light the appropriate color (amber, green, or red).
  - As each input and output is selected, the associated output button blinks the appropriate color to indicate a tentative tie. Buttons for outputs that were already tied to the input light the appropriate color steadily. Outputs that are already tied can be left on, along with new blinking selections, or toggled off by pressing the associated output button.
  - If you press the input button for an input that is I/O grouped (see “**I/O grouping**”, on page 39) and then try to select an output in a different group, you cannot select the associated output button. The associated input button remains lit.

## Example 1: Create a set of video and audio ties

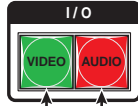
1. **Clear all selections:** Press and release the Esc button.

Press the Esc button to clear all selections.



The button flashes once.

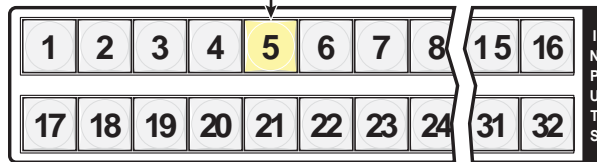
2. **Select video and audio for the tie:** If necessary, press and release the the Video button and the Audio button to light both.



Press the Video button to toggle on and off. Press the Audio button to toggle on and off.  
The button lights **green** when selected. The button lights **red** when selected.

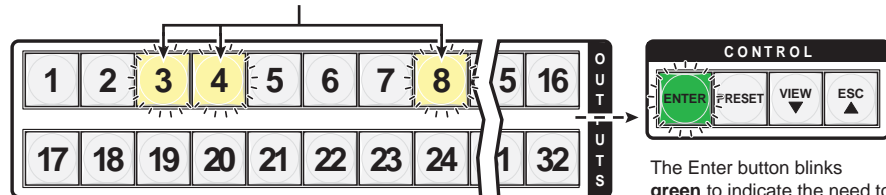
3. **Select an input:** Press and release the input 5 button.

Press the button.  
The button lights **amber**.



4. **Select the outputs:** Press and release the output 3, output 4, and output 8 buttons.

Press the buttons.  
The buttons blink **amber** to indicate that the selected **video** and **audio** inputs will be tied to these outputs.



The Enter button blinks **green** to indicate the need to confirm the change.

**NOTE:** You can cancel the entire set of ties at this point by pressing and releasing the Esc button. The Esc button flashes once.

5. **Confirm the change:** Press and release the Enter button.

Press the Enter button to confirm the configuration change.

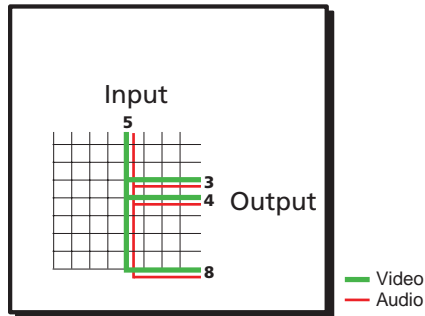


All **input buttons** and **output buttons** return to unlit or background illumination.

The Enter button returns to unlit or background illumination.

The current configuration (see figure 20) is now:

- Input 5 video and audio are tied to output 3, output 4, and output 8



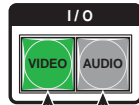
**Figure 20. Example 1, Final Configuration**

### Example 2: Add a video tie to a set of video and audio ties

In the following example, a new video tie is added to the current configuration. The example shows the front panel indications that result from your actions.

**NOTE:** This example assumes that you have performed **example 1**.

1. **Clear all selections:** Press and release the Esc button.
2. **Select video only for the tie:** Press and release the Video button and the Audio button as necessary to light Video only.



Press the Video button to toggle on and off. Press the Audio button to toggle on and off. The button lights **green** when selected. The button is **unlit** or **background illuminated** when deselected.

3. **Select an input:** Press and release the Input 5 button.

Press the button.

The button lights **green** to indicate that **video** outputs can be tied to or untied from this input.

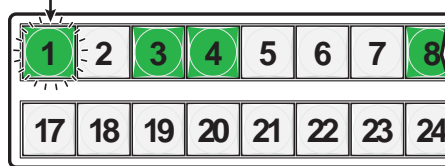
The Output 3, Output 4, and Output 8 buttons light **green** to indicate the **video** ties created in example 1.



4. **Select the output:** Press and release the Output 1 button.

Press the button.

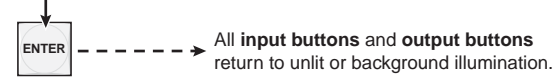
The button blinks **green** to indicate that only the selected **video** input will be tied to this output.



The Enter button blinks **green** to indicate the need to confirm the change.

**5. Confirm the change:** Press and release the Enter button.

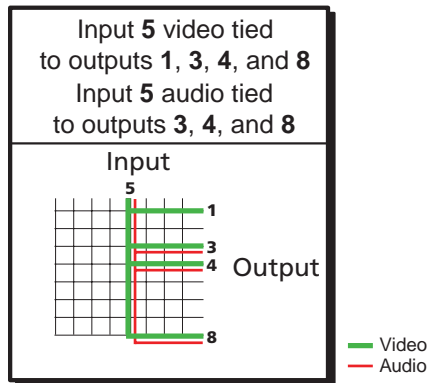
Press the Enter button to confirm the configuration change.



The Enter button returns to unlit or background illumination.

The current configuration (see figure 21) is now:

- **Video** — Input 5 video is tied to output 1, output 3, output 4, and output 8.
- **Audio** — Input 5 audio is tied to output 3, output 4, and output 8.



**Figure 21. Example 2, Final Configuration**

**Example 3: Remove a tie from a set of ties**

In the following example, an existing tie is removed from the current configuration. The example shows the front panel indications that result from your actions.

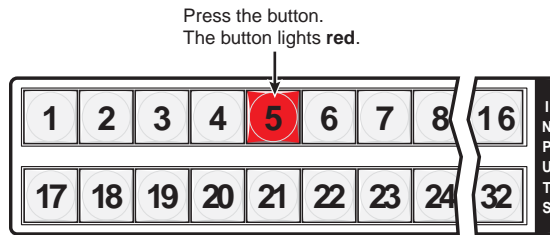
**NOTE:** This example assumes that you have performed **example 1** and **example 2**.

1. **Clear all selections:** Press and release the Esc button.
2. **Select audio only for the tie:** Press and release the Video button and the Audio button as necessary to light Audio only.

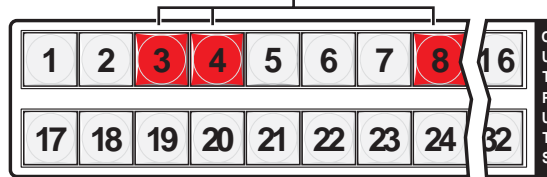


Press the Video button to toggle on and off. The button is **unlit** or **background illuminated** when deselected. Press the Audio button to toggle on and off. The button lights **red** when selected.

3. **Select an input:** Press and release the input 5 button.



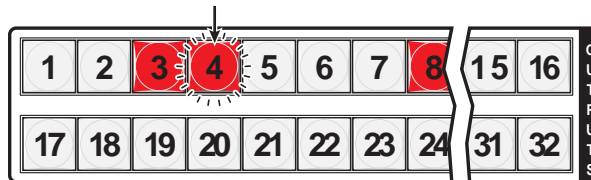
The Output 3, Output 4, and Output 8 buttons light red to indicate the **audio** ties created in example 1.



The Output 1 button **does not light** to indicate the tie created in example 2 because that tie is **video** only.

4. **Select the output:** Press and release the output 4 button.

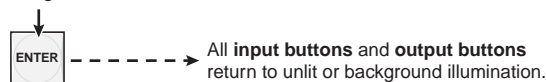
Press the button.  
The button blinks red to indicate the pending change: **audio** input will be untied.



The Enter button blinks **green** to indicate the need to confirm the change.

5. **Confirm the change:** Press and release the Enter button.

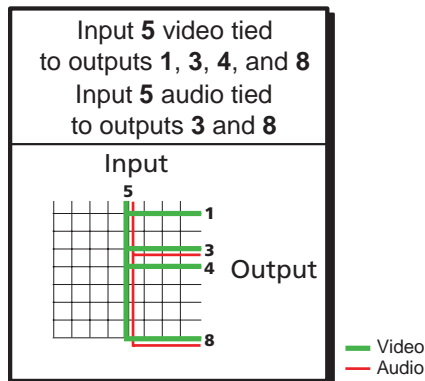
Press the Enter button to confirm the configuration change.



The Enter button returns to unlit or background illumination.

The current configuration (see figure 22) is now:

- **Video** — Input 5 video is tied to output 1, output 3, output 4, and output 8.
- **Audio** — Input 5 audio is tied to output 3 and output 8.



**Figure 22. Example 3, Final Configuration**

## Viewing the Configuration

The current configuration can be viewed using the front panel buttons. The View-only mode prevents inadvertent changes to the current configuration. View-only mode also provides a way to mute audio or RS-232 outputs (see “[Muting and Unmuting Audio/RS-232 Outputs](#)” on page 46).

View the current configuration as follows:

1. Press the Esc button to clear any input button indications, output button indications, or control button indications that may be on.
2. Press and release the View button. All of the buttons light for outputs that are **not** tied as follows:
  - **Amber:** No tied video **or** audio input
  - **Green:** No tied video input
  - **Red:** No tied audio input

If you press an output button for which there are no ties, the output buttons light for all outputs without ties.

3. Select video, audio, or both to view by pressing the Video button, Audio button, or both.
4. Select the desired input or output(s) whose ties you wish to view by pressing the input and output buttons.

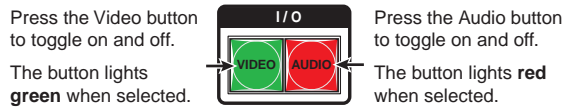
- NOTES:**
- To see all ties of the current configuration, press and release each input and output button, one at a time, with the Video button and the Audio button lit.
  - When you view video and audio ties, the Video button is lit green and the Audio button is lit red. After you select an input or output, the output buttons light different colors to show where video and audio ties are not the same (audio is broken away). Amber indicates video and audio, green indicates video only, and red indicates audio only.
  - After 30 seconds of front panel inactivity, View-only mode automatically deselects.

### Example 4: Viewing video and audio (RS-232), audio (RS-232) only, and video only ties

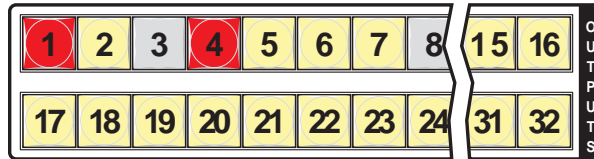
In the following example, we view the video and audio (or RS-232), audio- (or RS-232) only, and video-only ties in the current configuration. The steps show the front panel indications that result from your action.

**NOTE:** This example assumes that you have performed [example 1](#), [example 2](#), and [example 3](#).

1. **Clear all selections:** Press and release the Esc button.
2. **Select *View-only* mode:** Press and release the View button. The View button lights red.
3. **Select video and audio for viewing:** Press and release the Video button and the Audio button as necessary to light both.

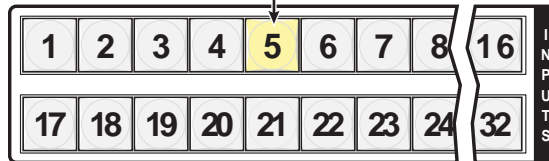


Until you select an input, the buttons for all untied outputs light **amber** if **no inputs** are tied, **green** if **no video inputs** are tied (only audio is tied), or **red** if **no audio or RS-232 inputs** are tied (only video is tied).



4. **Select an input:** Press and release the input 5 button.

Press the button. It lights **amber**.



The output buttons for outputs that **are** tied to Input 5 light or blink the appropriate color:

- **Lit amber** for **audio** and **video** ties (audio follow)
- **Lit green** for **video** ties (audio breakaway)
- **Red** for **audio/RS-232** ties (audio/RS-232 breakaway)



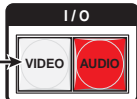
The output buttons for outputs that are **not** tied to Input 5 are either unlit or background illuminated.



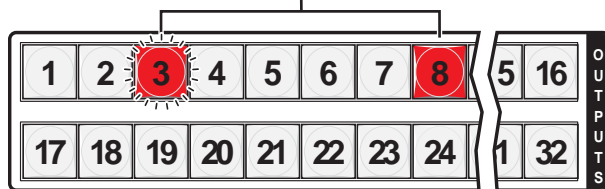
**NOTE:** You can also view a set of ties by selecting a tied output. Demonstrate this as follows:

- Note the number of a lit output button, and then press and release the output button for an untied (unlit or background illumination) output.
- Observe that all of the untied outputs light.
- Then press the output button that you noted previously
- Observe that the selected output button, the tied input button (input 5), and the output buttons light for all of the outputs that are tied to the input.

**5. Deselect video:** Press and release the Video button.

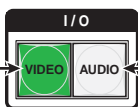
Press the button. The button is unlit or background illuminated when deselected.  The Audio button remains lit red to indicate that only audio is selected.

The output buttons for outputs that are tied to Input 5 light red to indicate audio or RS-232 ties (audio breakaway).

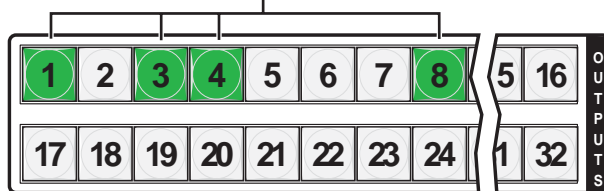


The output buttons for outputs that are not tied to Input 5 are either unlit or background illuminated.

**6. Toggle audio off and video on:** Press and release the Video button and the Audio button.

Press button. The button lights green when selected.  Press the button. The button is unlit or background illuminated when deselected.


The output buttons for outputs that are tied to Input 5 light green to indicate video ties (audio breakaway).



The output buttons for outputs that are not tied to Input 5 are either unlit or background illuminated.

If video ties are established for input 5, the output buttons light green for all video outputs tied to input 5. If no ties are established for input 5, all output buttons return to either unlit or to background illumination.

**7. Exit View-only mode:** Press and release the View button

Press the button.  All input buttons and output buttons return to unlit or background illumination.

The View button returns to unlit or background illumination.

## I/O Grouping

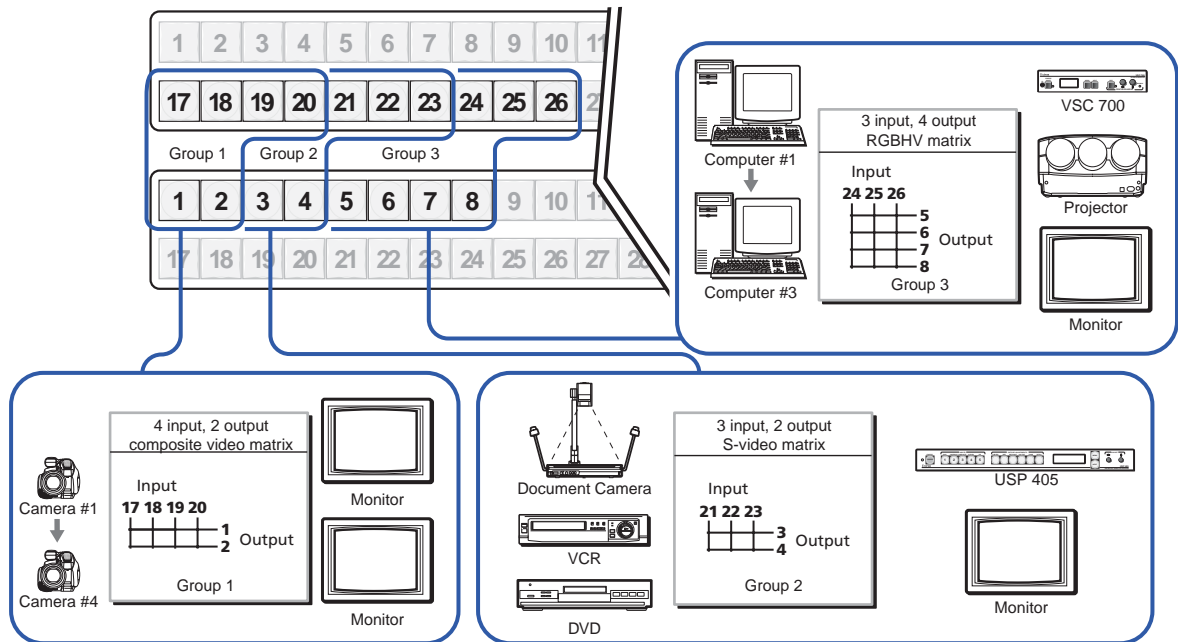
I/O grouping is a matrix switcher feature that allows you to subdivide the front panel controls of the matrix into four smaller functional sub-switchers and limit tie creation **using the front panel only**. Inputs and outputs can be assigned to one of four groups or not assigned to any group.

When you are creating ties on the front panel, inputs and outputs that are assigned to a group can be tied only to other outputs and inputs within the same group. For example, a front panel operator cannot tie an input that is assigned to group 1 to an output that is assigned to group 2. Ungrouped inputs and outputs can be switched to outputs and inputs in any group. Ties between groups (an input in group 1 tied to an output in group 2) **can** be created under serial port, USB port, or Ethernet control.

Suggested applications for the I/O grouping feature include:

- Segregating specific video formats to prevent an input in one video format from being inadvertently applied to an output device that supports another video format (see [figure 23](#))
- Segregating input and output devices that are in separate rooms
- Segregating input and output devices on which you are distributing audio on the audio/RS-232 wire pair from those on which you are distributing RS-232 signals.
- Isolating video from being displayed on specific output devices for operational security reasons.

**NOTE:** All of the equipment in this figure is connected through the appropriate MTP transmitter or receiver.



**Figure 23. I/O Grouping of Incompatible Video Formats**

The I/O groups can be set up on the front panel or by using Remote port, USB port, or LAN ports and either the SIS (see the [“Programming Guide”](#) section) or the Matrix Switchers Control Program (see the [“Matrix Software”](#) section).

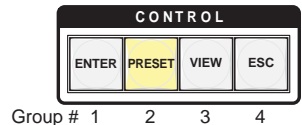
You can break audio away from the video for a given input or output (assign video and audio to different groups) by isolating only video or only audio using the front panel Video and Audio buttons after you select I/O Group mode (between steps **2** and **3**, below).

Audio breakaway across different groups can be confusing when you are operating the front panel. Breakaway grouping is not displayed by the Matrix Switchers Control Program, HTML pages, or SIS commands; and is not recommended (breakaway ties, once created, are displayed).

Create I/O groups on the front panel as follows:

**NOTE:** I/O groups are protected when front panel Lock mode 2 is selected. You can view the groups in Lock mode 2, but you cannot change them from the front panel (see “**Setting the Front Panel Locks (Executive Modes)**” on page 59).

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *I/O Group* mode, press and **hold** the Input 1 and Output 1 buttons until the input and output buttons light to display the ungrouped inputs and outputs.
3. Press and release one of the Control buttons to select a group:
  - Press the Enter button to select group 1.
  - Press the Preset button to select group 2.
  - Press the View button to select group 3.
  - Press the Esc button to select group 4.
4. Select the desired input or inputs and output or outputs to assign to the group by pressing the input and output buttons.
5. Press and release the Video and Audio button to exit the *I/O Group* mode, or allow the mode to time out after approximately 30 seconds.

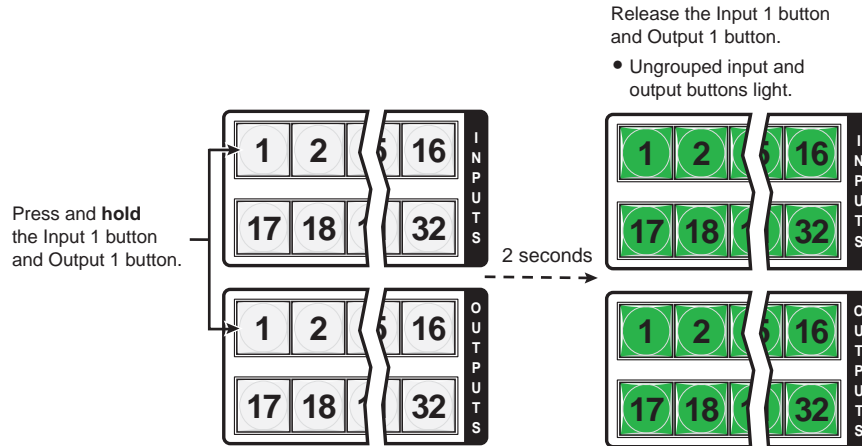


- NOTES:**
- Ties between groups (an input in group 1 tied to an output in group 2) can be created under serial port, USB port, or Ethernet control.
  - Ties that were created before I/O groups were created remain valid, even if they include inputs and outputs in different groups.
  - Presets can be created under serial port, USB port, or Ethernet control that tie inputs and outputs across group boundaries. These presets are selectable from the front panel.
  - An input or output can be assigned to only one group. If you assign an input or output to a group and that input or output is already assigned to a different group, the older grouping is discarded in favor of the new grouping.
  - For I/O groups to have any function, at least two groups must be created.

## Example 5: Grouping inputs and outputs

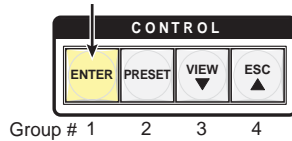
In the following example, several switcher inputs and outputs are assigned to groups. The steps show the front panel indications that result from your action.

1. **Clear all selections:** Press and release the Esc button.
2. **Enter I/O Group mode:** Simultaneously press and **hold** the Input 1 and Output 1 buttons for approximately 2 seconds and then release the buttons.



3. **Select group 1:** Press and release the Enter button.

Press the button.  
The button lights amber to indicate the selection.

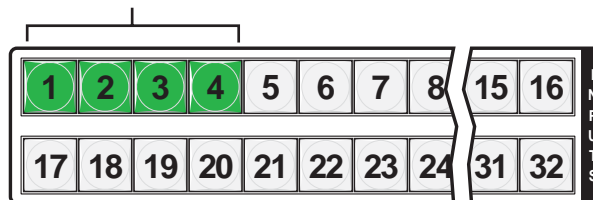


**NOTE:** I/O groups are protected when front panel Lock mode 2 is selected. You can view the groups in Lock mode 2, but you cannot change them from the front panel (see **“Setting the Front Panel Locks (Executive Modes)”** on page 59).  
If front panel Lock mode 2 is selected and you try to perform step 4, the actions are ignored and the Enter, Video, and Audio buttons flash.

4. **Assign inputs and outputs to group 1:**

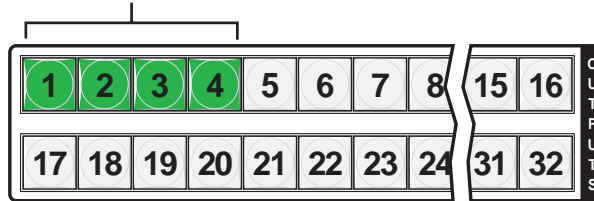
- a. Press and release the Input 1 through 4 buttons.

Press the buttons.  
The selected buttons light green.



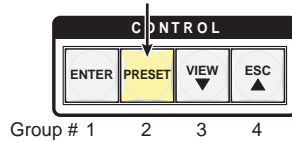
- b. Press and release the Output 1 through 4 buttons.

Press the buttons.  
The selected buttons light green.



5. **Select group 2:** Press and release the Preset button.

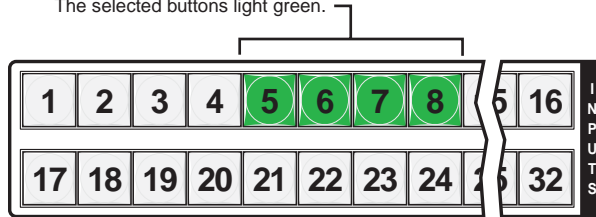
Press the button.  
The button lights amber to indicate the selection.



6. **Assign inputs and outputs to group 2:**

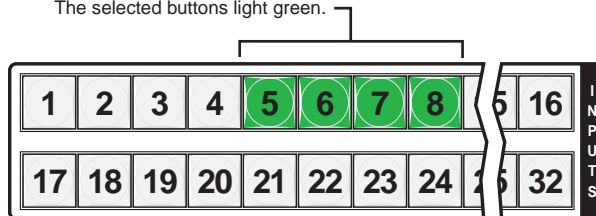
- a. Press and release the Input 5 through 8 buttons.

Press and release the buttons.  
The selected buttons light green.



- b. Press and release the Output 5 through 8 buttons.

Press and release the buttons.  
The selected buttons light green.



7. **Exit I/O Group mode:** Simultaneously press and release the Video button and Audio button.

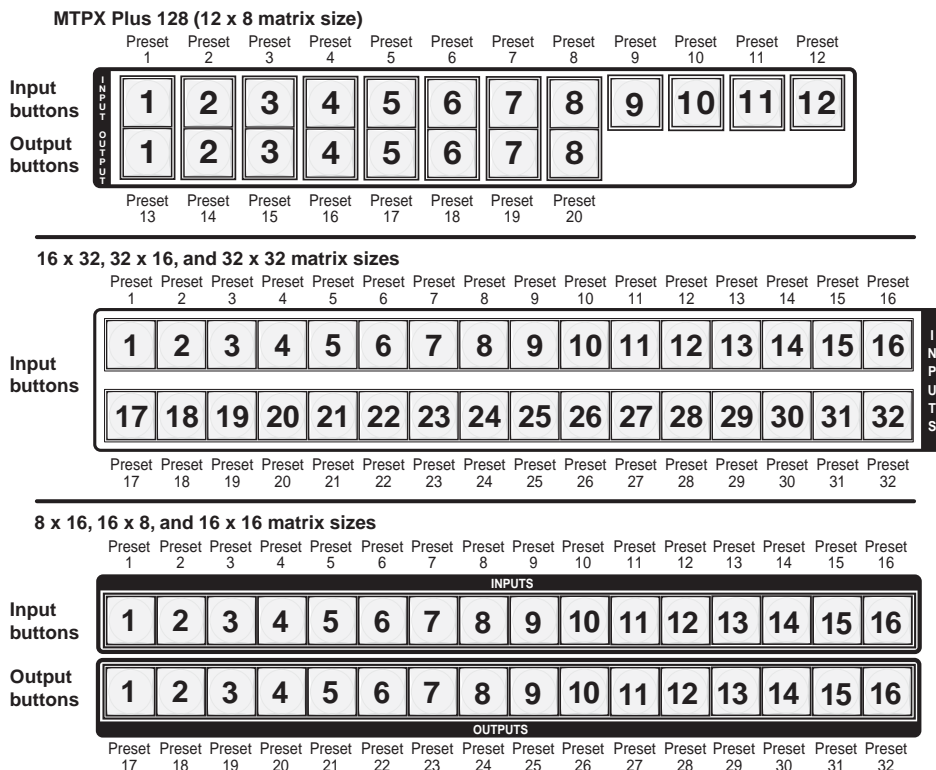
**NOTE:** If you do nothing for approximately 30 seconds, the front panel times out and the switcher exits I/O Group mode:

- Group 1 consists of inputs 1 through 4 and outputs 1 through 4.
- Group 2 consists of inputs 5 through 8 and outputs 5 through 8.

## Using Presets

The current configuration (configuration 0) can be saved as a preset in any one of 32 preset memory addresses. All 32 presets are assigned to the input buttons and (where necessary) output buttons and are available to be either saved or retrieved from the front panel. Up to 20 (MTPX Plus 128) or all 32 (all other models) presets can be selected from the front panel to be either saved or retrieved. When a **preset** is retrieved from memory, it becomes the **current configuration**.

- NOTES:**
- Only the audio and video ties are stored and recalled; audio gain settings are not saved, and they do not change when a preset is recalled.
  - Presets **cannot** be viewed from the front panel unless they are recalled as the current configuration. Presets **can** be viewed using the Extron Matrix Switchers Control Program (see the “**Matrix Software**” section).
  - The current configuration and all presets are stored in non-volatile memory. When power is removed and restored, the current configuration is still active and all presets are retained.
  - When a preset is recalled, it replaces the current configuration, which is lost unless it is also stored as a preset. The recalled preset overwrites all of the current configuration ties in favor of the preset configuration ties.
  - All models have 32 presets; on the MTPX Plus 128, preset numbers that are too high to be available from the front panel are still accessible under serial port, USB, or Ethernet control.
  - Figure 24 shows the presets associated with the three input and output button configurations for the MTPX Plus matrix switchers.

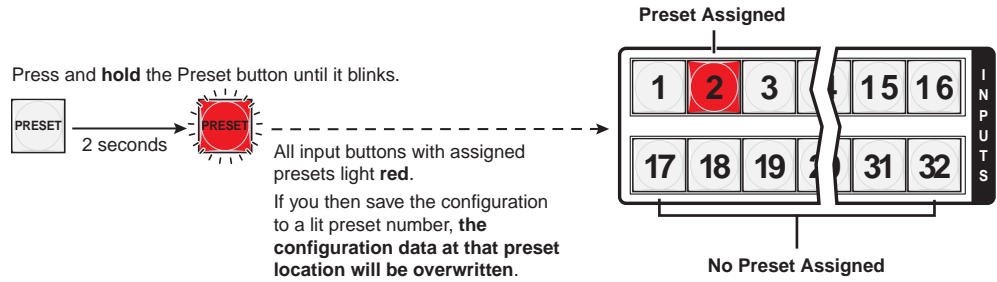


**Figure 24. Preset Locations**

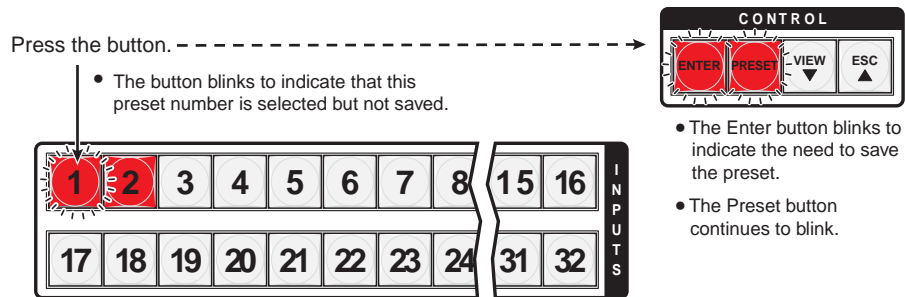
## Example 6: Saving a preset

In the following an example, the current configuration is saved as a preset. The example shows the front panel indications that result from your actions.

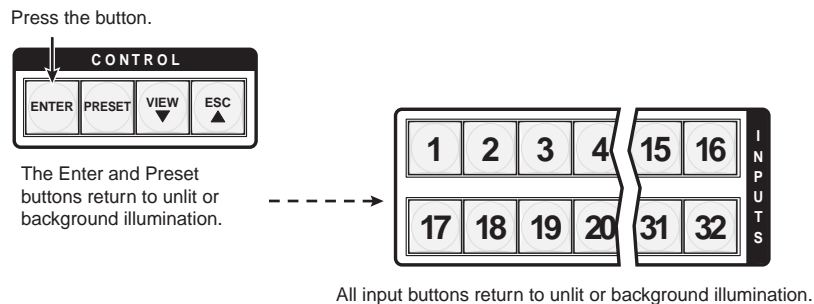
- 1. Clear all selections:** Press and release the Esc button.
- 2. Select Save Preset mode:** Press and **hold** the Preset button for approximately 2 seconds until it blinks.



- 3. Select the preset:** Press and release the input button or output button for the desired preset.



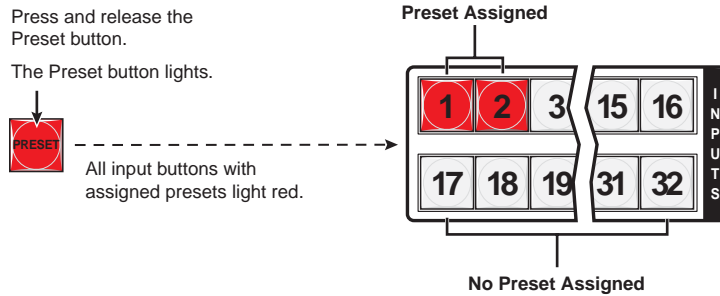
- 4. Save the Preset:** Press and release the Enter button to save the preset. The current configuration is now stored in the selected memory location.



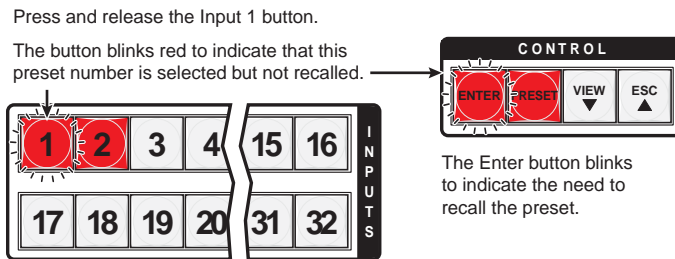
## Example 7: Recalling a preset

In the following example, a preset is recalled to become the current configuration. The steps show the front panel indications that result from your action.

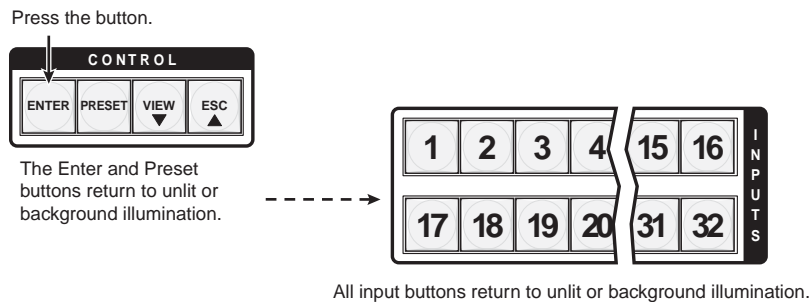
- 1. Clear all selections:** Press and release the Esc button.
- 2. Select Recall Preset mode:** Press and release the Preset button.



- 3. Select the preset:** Press and release the input button or output button for the desired preset.



- 4. Recall the preset:** Press and release the Enter button. The configuration stored in the selected memory location is now the current configuration and can be viewed in the *View-only* mode (see [example 4](#) on page 37).





## Muting and Unmuting Audio/RS-232 Outputs

Individual audio or RS-232 outputs can be muted or unmuted as follows:

**NOTE:** Output mutes are protected when front panel Lock mode 2 is selected. You can view the status of the output (muted or unmuted) in Lock mode 2 but you cannot change it from the front panel (see “[Setting the Front Panel Locks \(Executive Modes\)](#)” on page 59).

1. Press the Esc button to clear any input button indications, output button indications, or control button indications that may be on.
2. Press and release the View button.
3. To select audio, press the Audio button if necessary, .
4. One at a time, press and hold the button(s) for the desired output(s) for approximately 2 seconds. The output button(s) for the selected output(s) blink to indicate the mute or return to their previous state to indicate the unmute.
5. Press and release the View button to return to normal switcher operation.

**NOTES:**

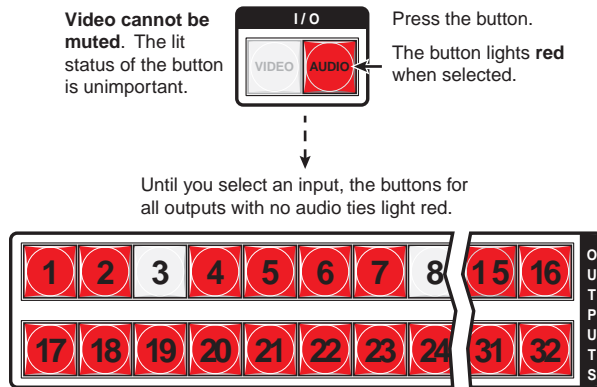
- You can mute only audio or RS-232 outputs, not video.
- When you enter *View-only* mode, the output LEDs turn **on** for all outputs **without** ties.
- If the audio/RS-232 wire pair of the selected input is defined as RS-232 (see “[Defining the Audio/RS-232 Wire Pair](#)” on page 62), the serial output is muted.
- Mutes are saved to non-volatile memory. When power is removed and restored, the mute settings are retained.

### Example 8: Muting and unmuting an audio/RS-232 output

In the following example, a switcher output is muted and unmuted. The steps show the front panel indications that result from your action.

- 1. Clear all selections:** Press and release the Esc button.
- 2. Select View-only mode:** Press and release the View button. The View button lights red.
- 3. Select audio (or RS-232) for viewing and muting:** If necessary, press and release the Audio button.

**NOTE:** This example assumes that you have performed [example 1](#), [example 2](#), and [example 3](#).

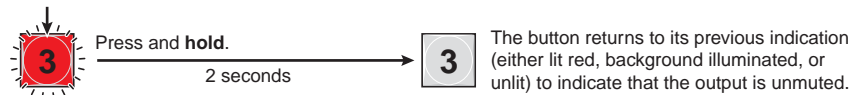


**NOTE:** Output mutes are protected when front panel Lock mode 2 is selected. You can view the mutes in Lock mode 2 but you cannot change them from the front panel (see “[Setting the Front Panel Locks \(Executive Modes\)](#)” on page 59).  
If front panel Lock mode 2 is selected and you try to perform steps 4 and 5, the actions are ignored.

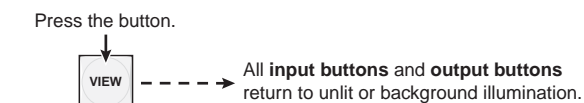
- 4. Mute an output:** Press and **hold** the Output 3 button for approximately 2 seconds until the button begins to blink..



- 5. Unmute an output:** Press and **hold** the Output 3 button for approximately 2 seconds until the button returns to its previous state.



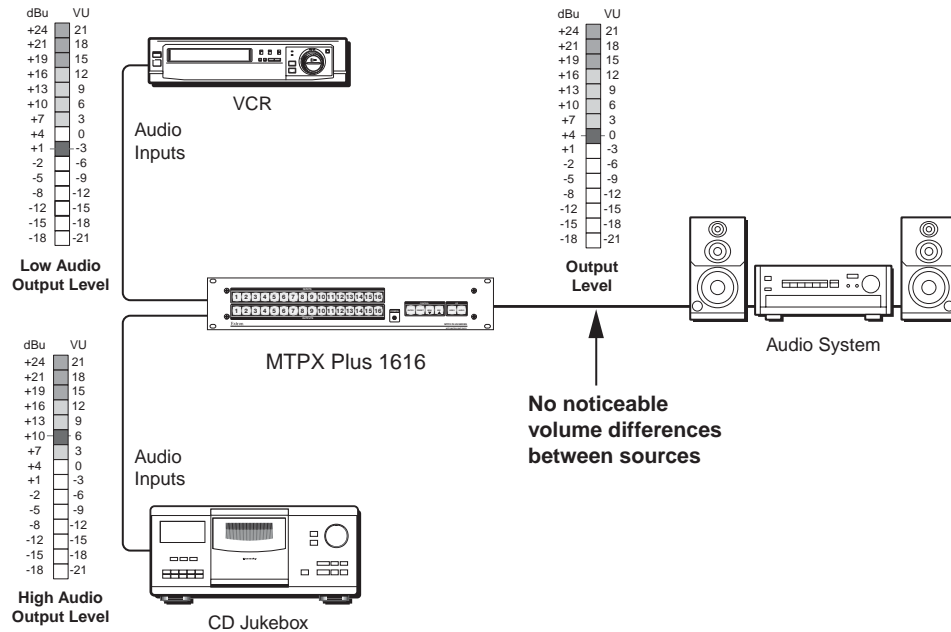
- 6. Exit View-only mode:** Press and release the View button.



The View button returns to unlit or background illumination.

## Viewing and Adjusting the Input Audio Level

The audio level of each input can be displayed and adjusted through a range of -18 dB to +24 dB to ensure that there is no noticeable volume difference among sources (see figure 25). The audio level can be adjusted from the front panel or under remote control. The default audio level is 0 dB.



**Figure 25. Audio Gain and Attenuation**

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *Audio* mode, press and **hold** the Audio button until the button begins to blink red, then release the button.
3. Press and release an input button to select an input. The output buttons display the audio level for the selected input; the more output LEDs lit, the greater the gain or attenuation.

- **Green** output buttons indicate a **gain** (+) audio level.
- **Red** output buttons indicate an **attenuation** (-) level.

Audio gain and attenuation is displayed differently on different models.

- **Switchers with 32 output buttons** — Each output button indicates 1 dB when lit steadily (see [table 4](#) on page 49).
  - **Switchers with 16 output buttons** — Each output button indicates 1 dB when blinking and 2 dB when lit steadily (see [table 5](#) on page 50).
  - **MTPX Plus 128 (8 output buttons)** — Each output button indicates 1 dB when blinking slowly, 2 dB when blinking quickly, and 3 dB when lit steadily (see [table 5](#) on page 50).
4. Press and release the Esc (▲) and View (▼) buttons to increase and decrease the audio level.
  5. Press and release the Audio button to exit the *Audio* mode. The Audio button stops blinking.

- NOTES:**
- Pressing the Enter or Preset button also exits *Audio* mode. Pressing the Preset button changes to Recall Preset mode.
  - There is one audio level setting per input. The audio level setting is shared by the left and right audio inputs.
  - The audio level settings are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.
  - Exiting *Audio* mode by pressing the Audio button always returns the I/O configuration to video and audio selected for configuration (Video and Audio buttons lit).

**Table 4. 32-output Button Audio Gain and Attenuation Display**

dB	MTPX Plus 1632, 3216, 3232	dB	MTPX Plus 1632, 3216, 3232
12		24	
11		23	
10		22	
9		21	
8		20	
7		19	
6		18	
5		17	
4		16	
3		15	
2		14	
1		13	
0			

= unlit button  
 = lit button

Green indicates a positive (gain) level.  
 Red indicates a negative (attenuation) level.

**Table 5. 8- and 16-output Button Audio Gain and Attenuation Display**

dB	MTPX Plus 128	dB	MTPX Plus 816, 168, 1616
24		24	
23		23	
22		22	
21		21	
20		20	
19		19	
18		18	
17		17	
16		16	
15		15	
14		14	
13		13	
12		12	
11		11	
10		10	
9		9	
8		8	
7		7	
6		6	
5		5	
4		4	
3		3	
2		2	
1		1	
0		0	

= Unlit button   
 = Blinking button  
 = Slow blinking button   
 = Fast blinking button   
 = Lit button

Green indicates a positive (gain) level. Red indicates a negative (attenuation) level.

## Example 9: Viewing and adjusting an input audio level

**NOTE:** This procedure can only be performed if the audio/RS-232 wire pair of the input is defined as audio (see “Defining the Audio/RS-232 Wire Pair” on page 62).

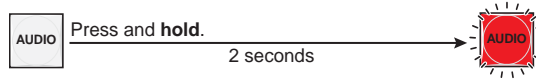
Because of the different gain and attenuation display schemes, the input audio levels that result from the following example are shown three times:

- As displayed on a 32-output button switcher
- As displayed on a 16-output button switcher
- As displayed on a 8-output button switchers

The 32-button drawings show the actions that led up to the display. The 16-button and 8-button drawings show the gain or attenuation display only, not the actions that caused it.

In the following example, an audio level is viewed and adjusted. The steps show the front panel indications that result from your action.

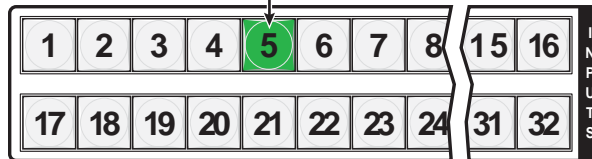
1. **Clear all selections:** Press and release the Esc button.
2. **Select Audio mode:** Press and **hold** the Audio button for approximately 2 seconds until it blinks.



3. **Select an input:** Press and release the Input 5 button (see figure 26).

Figure 26 through **figure 28** show an audio gain level of +8 dB.

Press the button. It lights green.

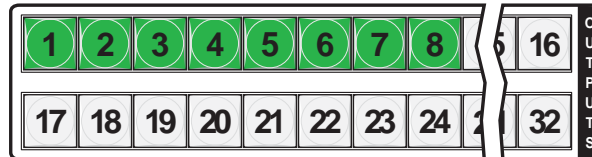


The output buttons display the audio level and polarity (gain or attenuation) of the selected input.

Each output button indicates 1 dB when lit.

When the buttons are lit **green**, then indicate a **gain (+)** audio level.

When the output buttons are lit **red**, they indicate an **attenuation (-)** level.



**Figure 26.** Select an Input

Figure 27 shows the same +8 dB level as figure 26, but displayed on a 16-output-button switcher, such as an MTPX Plus 816.



**Figure 27.** Level Display on a 16-Output-Button Switcher

Figure 28 shows the same +8 dB level as figure 26, but displayed on an 8-output-button MTPX Plus 128.

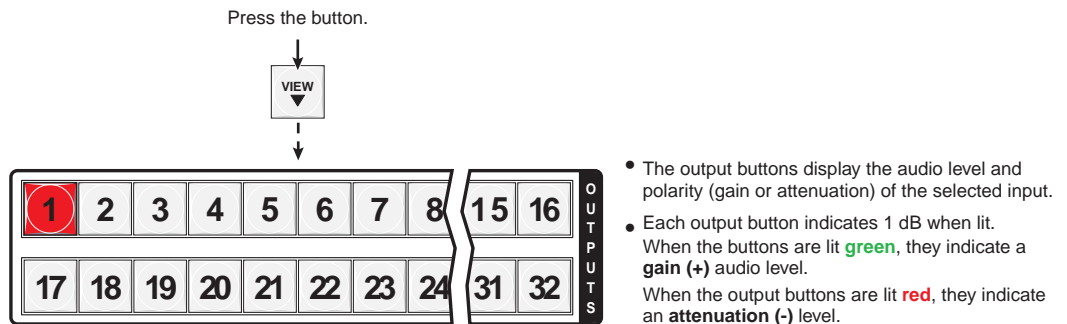


**Figure 28. Level Display on an 8-Output-Button Switcher**

4. **Change the audio level:** Press and release the View (▼) button once (see figure 29) to decrease the input audio level by 1 dB.

Press and release the View (▼) button several more times (see figure 29) to decrease the input audio level by 1 dB per button press. Note the output button indication changes that occur each time the View (▼) button is pressed.

Figure 29 through figure 31 show the result of pressing the View (▼) button a total of nine times, an audio attenuation level of  $-1$  dB. Note that the level is now displayed in red to indicate a negative level.



**Figure 29. Adjust the Input Audio Level**

Figure 30 shows the same  $-1$  dB level as in figure 3-49, but displayed on a 16-output-button switcher, such as a MTPX Plus 1616.



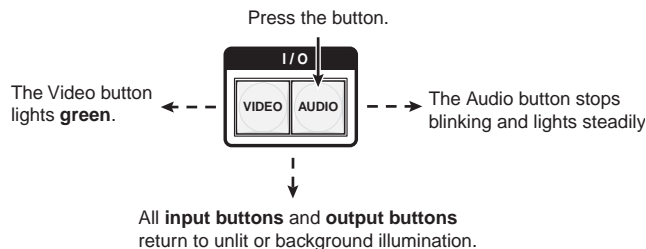
**Figure 30. Level Display on a 16-Output-Button Switcher**

Figure 31 shows the same  $-1$  dB level as in figure 3-49, but displayed on an 8-output-button MTPX Plus 128.



**Figure 31. Level Display on an 8-Output-Button Switcher**

5. **Exit Audio mode:** Press and release the Audio button.





## Viewing and Adjusting the Local Output Volume

The audio level of each local output can be displayed and adjusted through a range of 100% (no attenuation) to 0% (maximum [76 dB] attenuation). The audio level can be adjusted from the front panel or under serial port, USB port, or Ethernet control. The default volume is 100% (no attenuation).

**NOTE:** Output volume is protected when front panel *Lock* mode 2 is selected. You can view the volume in *Lock* mode 2 but you cannot adjust it from the front panel (see “**Setting the Front Panel Locks (Executive Modes)**” on page 59).

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *Audio* mode, press and **hold** the Audio button until the button begins to blink red, then release the button.
3. Press and release an output button to select an output. The input buttons display the volume level for the selected output. As a general rule, the more buttons that are lit, the higher the volume. The fewer buttons that are lit, the lower the volume.

For a more detailed analysis of decoding the displayed value, see “**Reading the displayed volume**”, on the next page.

4. Press and release the Esc (▲) and View (▼) buttons to increase and decrease the audio volume.
5. Press and release the Audio button to save the audio settings and exit the *Audio* mode. The Audio button stops blinking.

**NOTES:**

- Only the volume for the local audio outputs (outputs 1 through 4 [matrix sizes 816, 168, and 1616] or outputs 1 through 8 [matrix sizes 1632, 3216, and 3232]) is adjustable. Outputs outside the local range cannot be selected in step 3.
- There is one audio volume level setting per local output. The audio level setting is shared by the left and right audio inputs.
- The audio volume levels are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.
- Exiting *Audio* mode by pressing the Audio button always returns the I/O buttons to Video lit green and Audio lit red.
- Pressing the Enter or Preset button also exits *Audio* mode. Pressing the Preset button changes to *Recall Preset* mode.



## Reading the displayed volume

This section is a detailed look at reading the output volume display on the front panel. If you do not need to read the exact value of the volume setting, skip this section.

There are 65 steps of volume attenuation, with 1 dB per step (button push), except for 0-to-1, which is 13 dB. At maximum attenuation, no input buttons are lit, 76 dB of attenuation is applied, and the audio output is effectively muted. At no attenuation, all input buttons are lit and the output volume is equal to the input signal plus any gain or attenuation that is applied to that specific input using the input audio level adjustment (see “**Viewing and Adjusting the Input Audio Level**”, on page 48). Other than the minimum and maximum volume, the switchers indicate the volume differently, depending on number (12, 16, or 32) of input buttons (see **table 6** on the next page to read the volume display for each display scheme).

For each display scheme, the input buttons blink or light sequentially to indicate the approximate volume of the selected output. Volume is defined as a percentage of the input audio signal that is applied to the output. From 0% of volume, the first Esc (▲) button push applies 5.5% of the input audio signal. From 5.5% on, each Esc (▲) push applies 1.5% more of the input audio signal to the output:

- **Push Esc (▲) button again** —  $5.5\% + 1.5\% = 7\%$  volume
  - **Switchers with 12 and 16 input buttons** — The Input 1 button blinks slowly
  - **Switchers with 32 input buttons** — The Input 1 button lights steadily
- **Push Esc (▲) button twice more** —  $7\% + 1.5\% + 1.5\% = 10\%$  volume
  - **Switchers with 12 input buttons** — The Input 1 button blinks quickly.
  - **Switchers with 16 input buttons** — The Input 1 button lights steadily
  - **Switchers with 32 input buttons** — The Input 1 and Input 2 button light steadily
- **Push Esc (▲) button 19 times more** —  $10\% + (19 \text{ times } 1.5\%) = 38.5\%$  volume
  - **Switchers with 12 input buttons** — The Input 1 through 4 buttons light steadily.
  - **Switchers with 16 input buttons** — The Input 1 through 5 buttons light steadily and the Input 6 button blinks
  - **Switchers with 32 input buttons** — The Input 1 through Input 11 buttons light steadily and the Input 12 button blinks

When all input buttons are lit for any switcher model, the audio output is 100% of the audio input level.

Another way to view the volume level is to think in terms of the attenuation that is applied to the output. Attenuation reduction is indicated by the lit or blinking input buttons: when fewer input buttons are lit, attenuation is greater (and the volume is quieter).

- At minimum volume, all input buttons are unlit or background illuminated and 76 dB of attenuation is applied to the output. The audio output is effectively muted.
- The first step of volume increase causes the Input 1 button to blink (slowly, in the case of switchers with 12 input buttons) . Attenuation is reduced by 13 dB (63 dB of attenuation is applied to the output).
- The second step of volume increase reduces the attenuation by an additional 1 dB (62 dB of attenuation is applied to the output). (On switchers with 32 input buttons the Input 1 button lights steadily.)
- Successive steps of volume increase cause consecutive input buttons to first blink and then light steadily. (On switchers with 32 input buttons, each consecutive button indicates a 1 dB **attenuation reduction** when blinking and a 2 dB **attenuation reduction** when lit.)

**Table 6. Audio Volume Display**

Highest # input button lit			dB of attenuation	Output volume	Highest # input button lit			dB of attenuation	Output volume
12-input switcher	16-input switcher	32-input switcher			12-input switcher	16-input switcher	32-input switcher		
None	None	None	76	0%					
Slow blink			63	5.5%	Fast blink			31	53.5%
Fast blink				62	7%				30
			61	8.5%	Slow blink			29	56.5%
Slow blink				60	10%				28
			59	11.5%	Fast blink			27	59.5%
Slow blink				58	13%				26
Fast blink			57	14.5%	Slow blink			25	62.5%
				56	16%				24
Slow blink			55	17.5%	Fast blink			23	65.5%
Fast blink				54	19%				22
			53	20.5%	Slow blink			21	68.5%
Slow blink				52	22%				20
Fast blink			51	23.5%	Fast blink			19	71.5%
Slow blink				50	25%				18
Fast blink			49	26.5%	Slow blink			17	74.5%
				48	28%				16
Slow blink			47	29.5%	Fast blink			15	77.5%
Fast blink				46	31%				14
Slow blink			45	32.5%	Slow blink			13	80.5%
Fast blink				44	34%				12
			43	35.5%	Fast blink			11	83.5%
Slow blink				42	37%				10
Fast blink			41	38.5%	Slow blink			9	86.5%
Slow blink				40	40%				8
Fast blink			39	41.5%	Fast blink			7	89.5%
				38	43%				6
Slow blink			37	44.5%	Slow blink			5	92.5%
Fast blink				36	46%				4
			35	47.5%	Fast blink			3	95.5%
Slow blink				34	49%				2
Fast blink			33	50.5%				1	98.5%
				32	52%				0

= blinking LED

**For example:** When lit steadily, the Input 3 button indicates the following, depending on the number of input buttons the switcher has:

- **Switchers with 12 input buttons** — 47 dB of attenuation when compared to the Input 3 button blinking quickly (48 dB to 50 dB of attenuation). The blinking Input 4 button (45 dB to 46 dB of attenuation) is at least 2 dB less than the fast blinking Input 3 button (48 dB minus 46 dB) and at most 5 dB less (50 dB *minus* 45 dB).
- **Switchers with 16 input buttons** — 52 dB of attenuation when compared to the Input 3 button blinking (53 dB to 55 dB of attenuation). The blinking Input 4 button (49 dB to 51 dB of attenuation) is at least 2 dB less than the blinking Input 3 button (53 dB minus 51 dB) and at most 6 dB less (55 dB *minus* 49 dB).
- **Switchers with 32 input buttons** — 58 dB of attenuation when compared to the Input 3 button blinking (59 dB of attenuation). The blinking Input 4 button (57 dB of attenuation) is 6 dB less than the steadily-lit Input 2 button (60 dB *minus* 57 dB).
- **On switcher with 32 input buttons**, the volume indications of the buttons are additive.

**For example:** Input 1 lit (23 dB [22 dB + 1 dB] of **attenuation reduction**), Input 2 lit (2 dB [1 dB + 1 dB] of **attenuation reduction**), and Input 3 blinking (1 dB of **attenuation reduction**) indicate that the output **attenuation has been reduced** by a total of 25 dB (22 dB + 2 dB + 1 dB = 25 dB).

- At full volume, no attenuation is applied to the output and all input buttons are lit steadily.

### Example 10: Viewing and adjusting a local output volume level

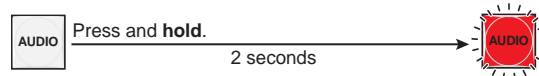
In the following example, the audio output volume is viewed and adjusted. The steps show the front panel indications that result from your action.

Because of the different volume display schemes, the output audio levels that result from the following example are shown three times:

- As displayed on a 32-input button switcher
- As displayed on a on 16-input button switcher
- As displayed on a 8-input button switchers

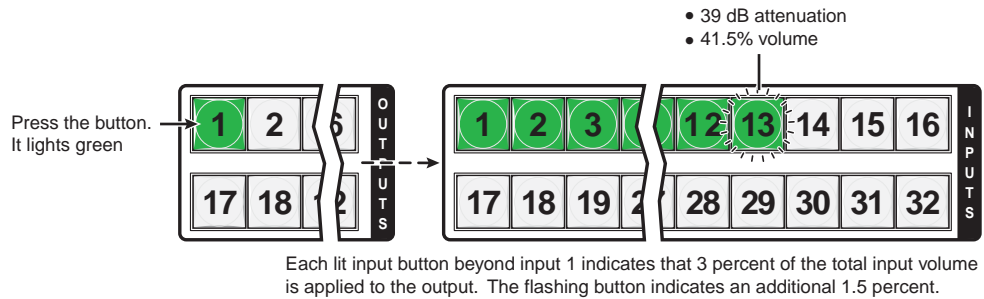
The 32-button drawings show the actions that led up to the display. 16-button and 8-button drawings show the volume display only, not the actions that caused it.

1. **Clear all selections:** Press and release the Esc button.
2. **Select Audio mode:** Press and **hold** the Audio button for approximately 2 seconds until it blinks.



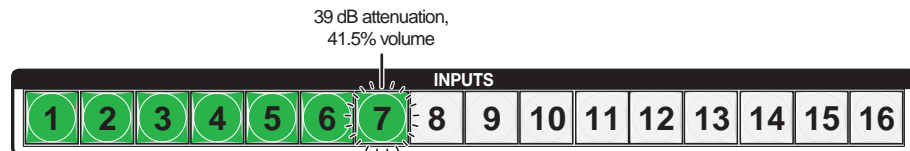
**3. Select an output:** Press and release the output 1 button.

In figure 32 through figure 34, the lit or blinking input buttons indicate 41.5 percent of the applied audio input. The unlit input buttons indicate an audio volume attenuation of 39 dB. Figure 33 and figure 34 show the same 41.5 percent, 39 dB volume.



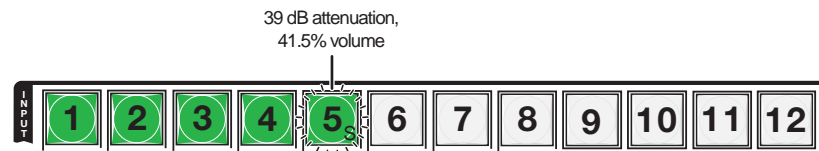
**Figure 32. Select Output 1**

Figure 33 shows the same volume as figure 32, but displayed on a 16-input-button switcher, such as an MTPX Plus 1616.



**Figure 33. Volume Display on a 16-Input-Button Switcher**

Figure 34 shows the same volume as figure 32, but displayed on a 12-input-button MTPX Plus 128.



**Figure 34. Volume Display on a 12-Input-Button Switcher**

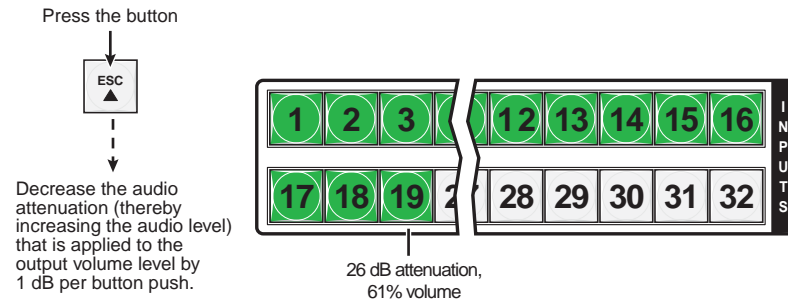
**NOTE:** Volume is protected when front panel *Lock mode 2* is selected. You can view the volume in *Lock mode 2* but you cannot change it from the front panel (see “[Setting the Front Panel Locks \(Executive Modes\)](#)” on page 59).  
If front panel *Lock mode 2* is selected and you try to perform step **4**, the actions are ignored and the Enter, Video, and Audio buttons flash.

- Change the volume:** Press and release the Esc (▲) button once (see figure 35) to increase the volume by 1.5%.

Press and release the Esc (▲) button several more times (figure 3-57) to increase the volume by 1.5% per button press. Note the input button indication changes that occur each time the Esc (▲) button is pressed and released.

**NOTE:** You can press and **hold** the Esc (▲) or View (▲) button to ramp the level up or down by 3 dB per second to the high or low limit.

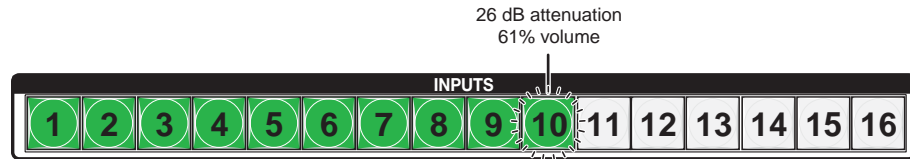
Figure 35 show the result of pressing the Esc (▲) button a total of 13 times. In figure 35 through figure 37, the lit or blinking input buttons indicate 61 percent of the applied audio input. The unlit input buttons indicate an audio volume attenuation of 26 dB.



Each lit input button beyond input 1 indicates that 3 percent of the total input is applied to the output.

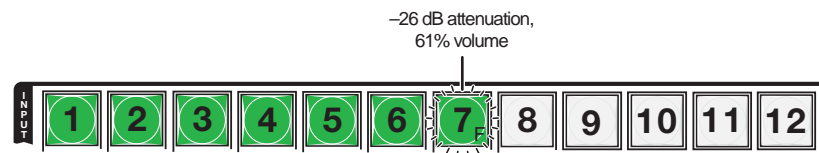
**Figure 35. Adjust the Output Audio Volume**

Figure 36 shows the same volume (61%) as in figure 35, but displayed on a 16-input-button switcher, such as an MTPX Plus 168.



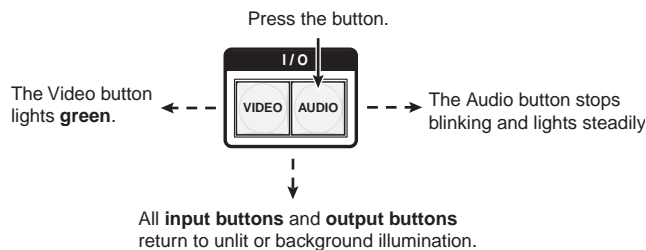
**Figure 36. Volume Display on a 16-Input-Button Switcher**

Figure 37 shows the same volume (61%) as in figure 35, but displayed on a 12-input-button MTPX Plus 128.



**Figure 37. Volume Display on a 12-Input-Button Switcher**

- Exit Audio mode:** Press and release the Audio button to (figure 3-60).



## Setting the Front Panel Locks (*Executive Modes*)

The matrix switcher has three levels of front panel security lock that limit the operation of the switcher from the front panel. The three levels are:

- **Lock mode 0** — The front panel is completely unlocked. All front panel functions are available.
- **Lock mode 1** — All changes are locked from the front panel (except for setting *Lock mode 2*). Some functions can be viewed.
- **Lock mode 2** — Basic functions are unlocked. Advanced features are locked and can be viewed only.

Basic functions consist of:

- Making ties
- Saving and recalling presets
- Setting input audio gain and attenuation
- Changing *Lock modes*

Advanced functions consist of:

- Creating I/O groups
- Setting audio output mutes
- Setting audio output volume
- Setting the rear panel remote port protocol and baud rate
- Setting the audio/RS-232 input format (audio or RS-232)

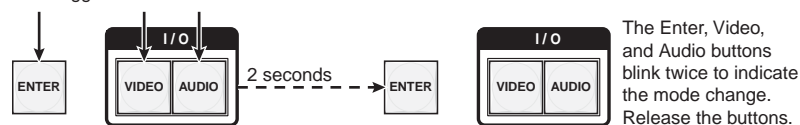
**NOTE:** The switcher is shipped from the factory in *Lock mode 2*.

## Selecting *Lock mode 2* or toggling between *mode 2* and *mode 0*

**NOTE:** If the switcher is in *Lock mode 0* or *mode 1*, this procedure selects *mode 2*.  
If the switcher is in *Lock mode 2*, this procedure selects *mode 0* (unlocks the switcher).

Toggle the lock on and off by pressing and holding the Enter button, the Video button, and the Audio button simultaneously for approximately 2 seconds (see figure 38).

Press and **hold** the Enter, Video, and Audio buttons simultaneously to turn on *Lock mode 2* or to toggle between *mode 2* and *mode 0*.



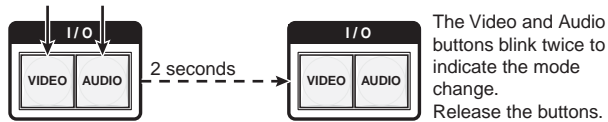
**Figure 38.** Toggle Front Panel Lock Between Mode 2 and Mode 0

## Selecting *Lock mode 2* or toggling between mode 2 and mode 1

**NOTE:** If the switcher is in *Lock mode 0* or mode 1, this procedure selects mode 2. If the switcher is in *Lock mode 2*, this procedure selects mode 1.

Toggle the lock on and off by pressing and holding the Video button and the Audio button simultaneously for approximately 2 seconds (see figure 39).

Press and **hold** the Video and Audio buttons simultaneously to turn on Lock mode 2 or to toggle between mode 1 and mode 2.



**Figure 39.** Toggle Front Panel Lock Between Mode 2 and Mode 1

## Performing a System Reset from the Front Panel

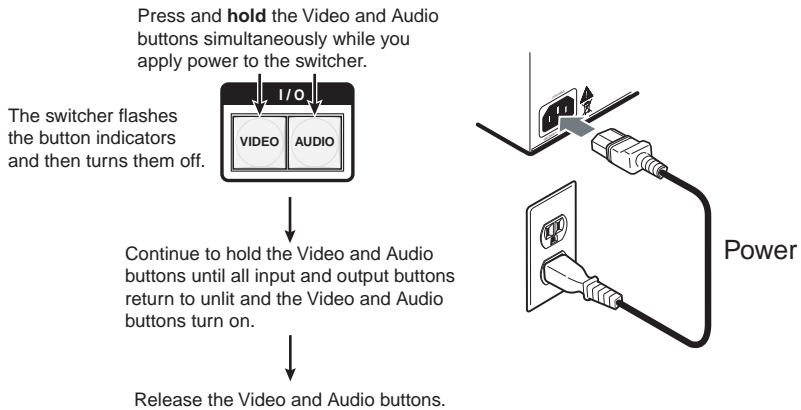
The front panel reset is identical to issuing the `[Esc]ZXXX←` SIS command (see the “**Programming Guide**” section). A system reset performs the following functions:

**NOTE:** System reset does not reset the Internet protocol (IP) settings or replace user-installed firmware.

- Clears all ties and presets
- Clears all audio or RS-232 mutes
- Resets all I/O grouping
- Resets all input level/peaking to zero
- Resets all input and output skew adjustments to zero.
- Resets all output pre-peaking to off
- Disables all RS-232 output inserts
- Sets all audio/RS-232 wire pair inputs to audio
- Resets all input audio levels to unity gain (0 dB)
- Sets all output volume levels to 100% (0 dB of attenuation)

**NOTE:** The system reset clears most image and audio adjustments. If you want to save these settings, use the Matrix Switchers Control Program and the **File > Save MATRIX settings as...** selection before you perform this reset (see the “**Matrix Software**” section).

Reset the switcher to the factory default settings by pressing and **holding** the Video button and Audio button simultaneously **while** you apply AC power to the switcher (see figure 40).



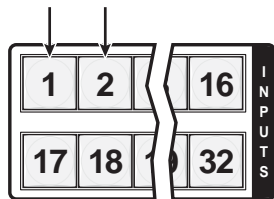
**Figure 40. System Reset**

**NOTE:** If background illumination was turned on before the reset, the I/O and control buttons are unlit after the reset. But, when you cycle power, background illumination returns to as selected.

## Background Illumination

The buttons on the front panel can be set to provide amber background illumination at all times or the background illumination can be turned off. To toggle the background illumination on or off, press and hold the Input 1 and Input 2 buttons simultaneously for approximately 2 seconds (see figure 41).

Press and **hold** the buttons.



After the illumination status of the buttons change (after approximately 2 seconds), release the buttons.

**Figure 41. Toggle Background Illumination on or off**



## Defining the Audio/RS-232 Wire Pair

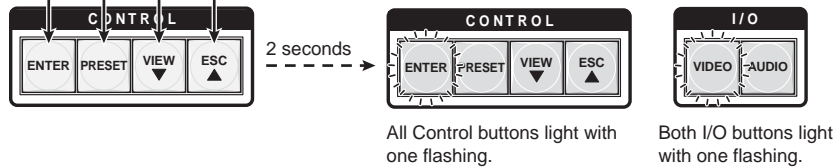
**NOTE:** The TP audio/RS-232 input wire pair configurations are protected when front panel Lock mode 2 is selected. You can view the configurations in *Lock mode 2* but you cannot adjust them from the front panel (see “**Setting the Front Panel Locks (Executive Modes)**” on page 59).

The switcher is compatible with MTPs that transmit and receive mono audio and those that transmit and receive RS-232 serial data. You must configure the switcher for the appropriate audio/RS-232 input for each TP input. The audio/RS-232 settings for each TP input can be viewed and changed from the front panel.

View and configure the TP input audio/RS-232 configuration settings for the switcher as follows:

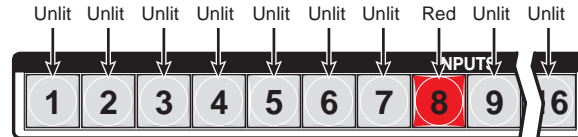
- 1. Select Serial Port and Audio/RS-232 Input Configuration mode:** Simultaneously press and **hold all** Control buttons (Enter, Preset, View, and Esc).

Press and **hold** the buttons.



**NOTE:** The Control and I/O buttons indicate the baud rate and protocol. See “**Selecting the Rear Panel Remote Port Protocol and Baud Rate**”, later in this section.

Unlit input buttons indicate that the audio/RS-232 twisted wire pair of the input is configured as audio. Red input buttons indicate that the audio/RS-232 twisted wire pair of the input is configured as RS-232.



- 2. Release the Control buttons.**

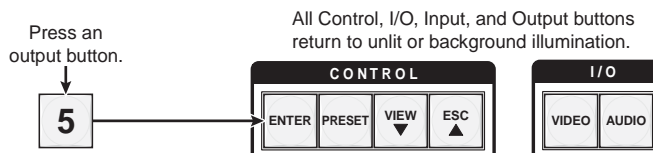
**NOTE:** If front panel *Lock mode 2* is selected and you try to perform step **3**, the actions are ignored and the Enter, Video, and Audio buttons flash (see “**Setting the Front Panel Locks (Executive Modes)**” on page 59).

- 3. Change the audio/RS-232 wire pair configuration for an input:** Press and release the input button to toggle the configuration for that input.

Press the button to toggle the audio/RS-232 wire pair configuration (to audio, in this example).



- 4. Exit the Serial Port and Audio/RS-232 Input Configuration mode:** Press and release an output button.



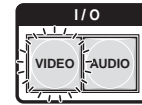
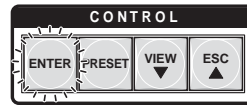
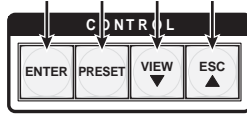
## Selecting the Rear Panel Remote Port Protocol and Baud Rate

All switchers can operate at the 9600, 19200, 38400, and 115200 baud rate. Switchers other than the MTPX Plus 128 can support either RS-232 or RS-422 serial communication protocol. The settings of these variables can be viewed and changed from the front panel.

View and configure the serial communications settings as follows:

1. **Select Serial Port and Audio/RS-232 Input Configuration mode:** Simultaneously press and hold all Control buttons (Enter, Preset, View, and Esc).

Press and hold the buttons.



**NOTES:**

- The Input buttons indicate the configuration of the secondary wire pairs. See “Selecting the TP wire pair secondary input”, earlier in this section.
- The MTPX Plus 128 is RS-232 only. For this switcher, the Video and Audio button indications have no meaning.

• All Control buttons light with one flashing.

• Both I/O buttons light with one flashing.

The flashing Control button indicates the **baud rate** as follows:  
 Enter — 9600                      Preset — 19200  
 View — 38400                      Esc — 115200

The flashing I/O button indicates the **protocol** as follows:  
 Video — RS-232                      Audio — RS-422/RS-485  
 In this example, the port is set to RS-232 at 9600 baud.

2. Release the Control buttons.

**NOTE:** If front panel Lock mode 2 is selected and you try to perform step 3, the actions are ignored and the Enter, Video, and Audio buttons flash (see “Setting the Front Panel Locks (Executive Modes)” on page 59).

3. **Change a value:** Press and release the button that relates to the desired value.

Press and release the button(s) to configure the port as follows:

**Baud rate:**

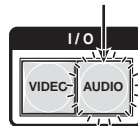
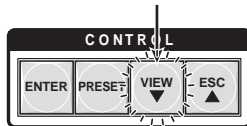
Enter — 9600                      Preset — 19200  
 View — 38400                      Esc — 115200

**Serial protocol:**

Video — RS-232                      Audio — RS-422/RS-485

The selected buttons blink and the others remain lit.

In this example, the port is set to RS-422 at 38400 baud.



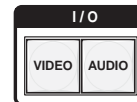
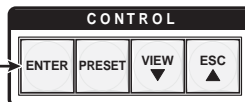
**NOTE:** The MTPX Plus 128 is RS-232 only. For this switcher, the Video and Audio button indications have no meaning.

4. **Exit the Serial Port and Audio/RS-232 Input Configuration mode:** Press and release an output button.

Press an output button.



All Control, I/O, Input, and Output buttons return to unlit or background illumination.



## Rear Panel Operations

The rear panel has a Reset button that initiates four levels of resets (numbered 1, 3, 4, and 5 for the sake of comparison with an Extron IPL product). The Reset button is recessed, so use a small screwdriver, a pointed stylus, or a ballpoint pen.

See [table 7](#) on the next page for a summary of the modes.

**CAUTION:** Review the reset modes carefully. Using the wrong reset mode may result in unintended loss of flash memory programming, port reassignment, or a controller reboot.

**NOTE:** The reset modes listed on the next page close all open IP and Telnet connections and close all sockets. Also, the following modes are separate functions, not a continuation from Mode 1 to Mode 5.

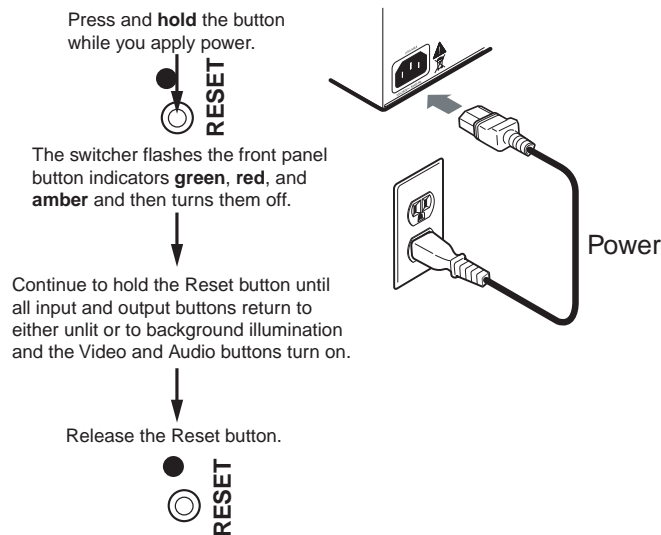
### Performing a Hard Reset (Reset 1)

The hard reset function restores the switcher to the base firmware that it was shipped with. After a hard reset, events do not automatically start, but user settings and files are restored.

Perform a hard reset as follows:

**NOTE:** The hard reset restores the factory-installed firmware. The switcher reverts to that factory firmware the next time power is cycled off and on **unless** a firmware update is performed before the power cycle.

1. If necessary, turn off power to the switcher.
2. Press and **hold** the Reset button on the rear panel **while** you apply AC power to the switcher (see figure 42).



**Figure 42.** Hard Reset

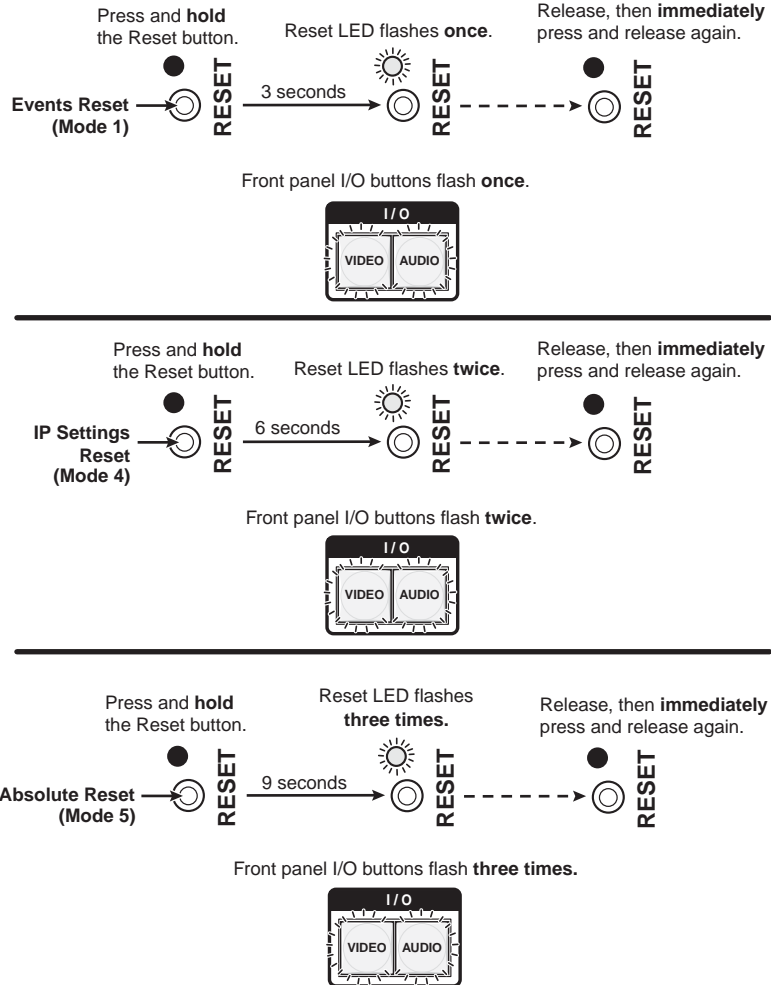
**Table 7. Reset Mode Comparison/Summary**

Mode	Activation	Result	Purpose/Notes
1	<p>Hold down the recessed Reset button while applying power to the switcher.</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>NOTE:</b> After a mode 1 reset is performed, update the switcher firmware to the latest version. Do not operate the switcher firmware version that results from the mode 1 reset. If you want to use the factory default firmware, you must upload that version again (see the “<b>Matrix Software</b>” section for details on uploading firmware).</p> </div>	<p><b>The switcher reverts to the factory default firmware.</b> Event scripting will not start if the switcher is powered on in this mode. All user files and settings (such as drivers, adjustments, and IP settings) are maintained.</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>NOTE:</b> If you do not want to update firmware, or you performed a mode 1 reset by mistake, cycle power to the switcher to return to the firmware version that was running before the mode 1 reset. Use the 0Q SIS command to confirm that the factory default firmware is no longer running (look for the asterisk [*] following the version number).</p> </div>	<p>Use mode 1 to revert to the factory default firmware version if incompatibility issues arise with user-loaded firmware.</p>
3	<p>Hold down the Reset button for about 3 seconds, until the Reset LED blinks once, then press and release Reset (&lt;1 second) within 1 second.</p>	<p><b>Mode 3 turns events on or off.</b> During resetting, the Reset LED flashes 2 times if events are starting, 3 times if events are stopping.</p>	<p>Mode 3 is useful for troubleshooting.</p>
4	<p>Hold down the Reset button for about 6 seconds, until the Reset LED blinks twice (once at 3 seconds and again at 6 seconds). Then press and release Reset (&lt;1 second) within 1 second.</p>	<p><b>Mode 4:</b></p> <ul style="list-style-type: none"> <li>• Enables ARP capability.</li> <li>• Sets the IP address to the factory default.</li> <li>• Sets the subnet address to the factory default.</li> <li>• Sets the gateway address to the factory default.</li> <li>• Sets port mapping to the factory default.</li> <li>• Turns DHCP off.</li> <li>• Turn events off.</li> </ul> <p>The Reset LED flashes four times in quick succession during the reset.</p>	<p>Mode 4 enables you to set IP address information using ARP and the MAC address.</p>
5	<p>Hold down the Reset button for about 9 seconds, until the Reset LED blinks three times (once at 3 seconds, again at 6 seconds, and then again at 9 seconds). Then press and release Reset (&lt;1 second) within 1 second.</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>NOTE:</b> Mode 5 reset clears most adjustments. To save these settings, use the Windows-based Matrix Switchers Control Program and the <b>File &gt; Save MATRIX settings as...</b> selection before you perform this reset (See the “<b>Matrix Software</b>” section).</p> </div>	<p><b>Mode 5 performs a complete reset to factory defaults (with the exception of the firmware):</b></p> <ul style="list-style-type: none"> <li>• Does everything mode 4 does.</li> <li>• Resets most all real time adjustments, including: clears all ties and presets, clears all audio or RS-232 mutes, clears all I/O grouping, clears all input level/peaking, clears all skew adjustments, clears all output pre-peaking, disables all RS-232 output inserts, sets all audio/RS-232 wire pairs to audio, clears all audio settings.</li> <li>• Resets all IP options.</li> <li>• Removes/clears all files for the switcher.</li> </ul> <p>The reset LED flashes four times in quick succession during the reset.</p>	<p>Mode 5 is useful if you want to start over with configuration and uploading or to replace events.</p>

## Performing Soft System Resets (Resets 3, 4, and 5)

Perform a soft reset of the switcher as follows:

1. Use a small screwdriver to press and **hold** the rear panel Reset button until the front panel Video and Audio buttons blink the number of times for the desired reset: once (events reset), twice (system reset), or three times (absolute reset) (see figure 43).



**Figure 43. Soft System Resets**

2. Release the Reset button and then immediately press and release the Reset button again. Nothing happens if the second momentary press does not occur within 1 second.

## Optimizing the Audio

Each audio level for each input can be adjusted within a range of -18 dB to +24 dB, so there are no noticeable volume differences between sources and for the best headroom and signal-to-noise ratio. The volume for each local audio output can be adjusted from full loudness to effectively muted. Adjust the levels as follows:

1. Connect audio sources to all desired inputs and connect the local audio outputs to output devices such as audio players. See **“Signal inputs”**, in the “Installation” section. For best results, wire all of the inputs and the outputs balanced.
2. Power on the audio sources, the switcher, and the audio players.
3. Switch among the inputs (see **“Creating a configuration”**, on page 31), listening to the audio with a critical ear or measuring the output audio level with test equipment, such as a VU meter.
4. As necessary, adjust the input audio level of each input (see **“Viewing and Adjusting the Input Audio Level”**, on page 48) so that the approximate output level is the same for all selected inputs.
5. Tie an audio input to each local audio output.
6. As necessary, adjust the output audio level of each output (see **“Viewing and Adjusting the Local Output Volume”**, on page 53).

## Video Adjustments

Image adjustments are available via SIS commands, the Matrix Switchers Control Program, and the built-in HTML pages. See **“Optimizing the Video”** in the “Matrix Software” section.

## Troubleshooting

This section recommends what to do if you have problems operating the switcher.

1. Ensure that all devices are plugged in and powered on.
2. Check to see if one or more outputs are muted.
3. Ensure an active input is selected for output on the switcher.
4. Ensure that the proper signal format is supplied.
5. Check the cabling and make corrections as necessary.
6. Call the Extron S3 Sales and Technical Support Hotline if necessary. **See the end** of this guide for the phone number in your region of the world.

## Configuration Worksheets

Rather than trying to remember the configuration for each preset, use worksheets to record this information. Make copies of the blank worksheet on [page 71](#) (32-input button and -output button switchers) and [page 72](#) (16-button and 12-button switchers) and use one for each preset configuration. Cross out all unused or inactive inputs and outputs. Use different colors for video and audio.

**NOTE:** All of the equipment in the following examples is connected through the appropriate MTP transmitter or receiver.

### Worksheet Example 1: System equipment

Figure 44 shows a portion of a worksheet for an MTPX Plus 1616 in a fictional organization with the system hardware annotated. Inputs 10, 11, and 13 have no connection in this organization, so they are crossed out on the worksheet. Similarly, outputs 7 and 9 through 16 are crossed out.

Input sources												
Camera/ mic - Main podium	Camera #2	PC 1 RGB 202	PC 2 RGB 202	Audio CD	Classroom #1 VCR USP 405	Classroom #2 VCR USP 405	Laptop RGB 202	Rack DVD (USP 405)	<del>X</del>	<del>X</del>	VTG 300	<del>X</del>
1	2	3	4	5	6	7	8	9	10	11	12	13

1	2	3	4	5	6	7	8	9	10	11	
Main hall FP #1	Main hall FP #2	Podium monitor	Sound system #1	Sound system #2	VCR (VSC 500)	<del>X</del>	DA 6	<del>X</del>	<del>X</del>	<del>X</del>	
Output destinations											

Preset # 3 Title: Weekly status mtg Video: ████████ Audio: ████████

Fill in the preset number and use colors, dashes, etc., to make connecting lines.  
Indicate if the configuration is for video, audio, or both.

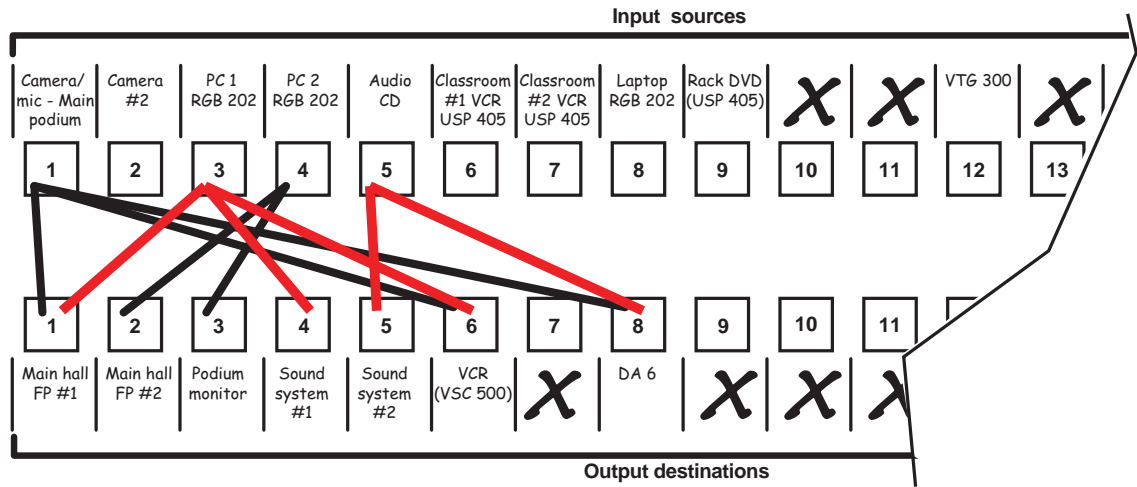
**Figure 44. Worksheet Example 1: System Equipment**

Inputs include PCs, an audio CD player, cameras, and an Extron VTG 300. Output devices include monitors, projectors, a stereo, and a VCR for recording presentations.

The VTG 300 video test generator connected to input 12 enables a video test pattern to be sent to one, several, or all output devices for problem isolation or adjustment purposes. An audio test tape or CD could be used in a similar manner to check out the audio components.

## Worksheet Example 2: Daily Configuration

Figure 45 continues from worksheet example 1 by showing the video and audio ties that make up the configuration of preset 1. Black lines shows video ties and red lines show the audio ties.



Preset # 3 Title: Weekly status mtg Video:            Audio:             
 Fill in the preset number and use colors, dashes, etc., to make connecting lines.  
 Indicate if the configuration is for video, audio, or both.

**Figure 45. Worksheet Example 2: Daily Configuration**

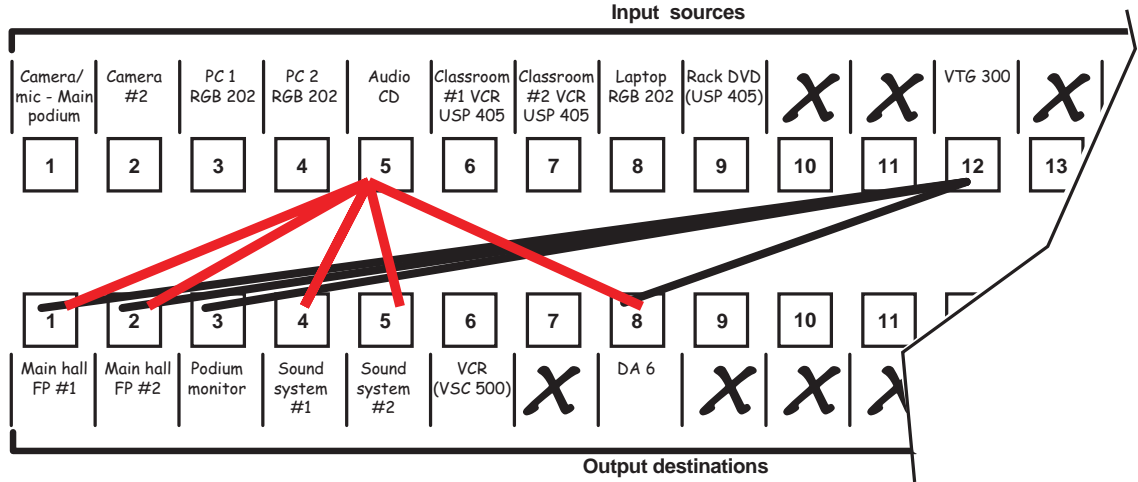
In this example:

- The image of the presenter, from the main podium camera (input 1), is:
  - Displayed in the main hall (output 1)
  - Displayed in the lobby via a distribution amplifier (output 8)
  - Tied to the VCR (output 6)
- The presenter has a presentation on her laptop computer (input 4) that is:
  - Displayed in the main hall (output 2)
  - Displayed locally on the podium (output 3)
- The audio from the microphone the presenter uses (input 3) is:
  - Played in the hall (output 1)
  - Played in the conference room (output 4)
  - Sent to the VCR (output 6)
- Classical music from the CD player (input 5) is:
  - Played in the background in the main hall on sound system #2 (output 5)
  - Played in the lobby via a distribution amplifier (output 8)



### Worksheet Example 3: Test configuration

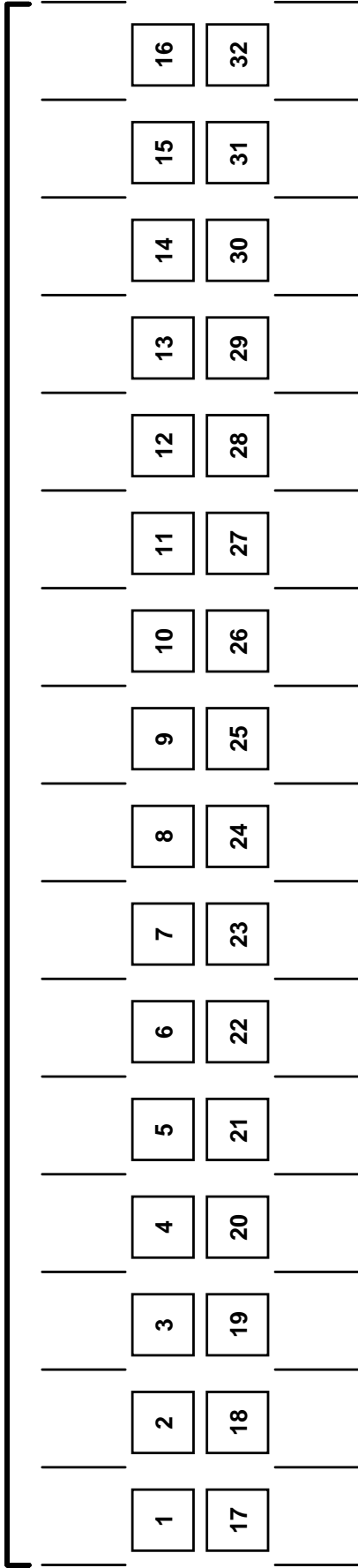
The AV system in our fictional organization needs to be fine tuned on a regular basis. Figure 46 shows a typical test configuration, with an Extron video test generator (input 12) generating a test pattern to all monitors (outputs 1, 2, 3, and 8). Sound checks are run from the CD player (input 5) to all audio systems (outputs 1, 2, 4, 5, and 8).



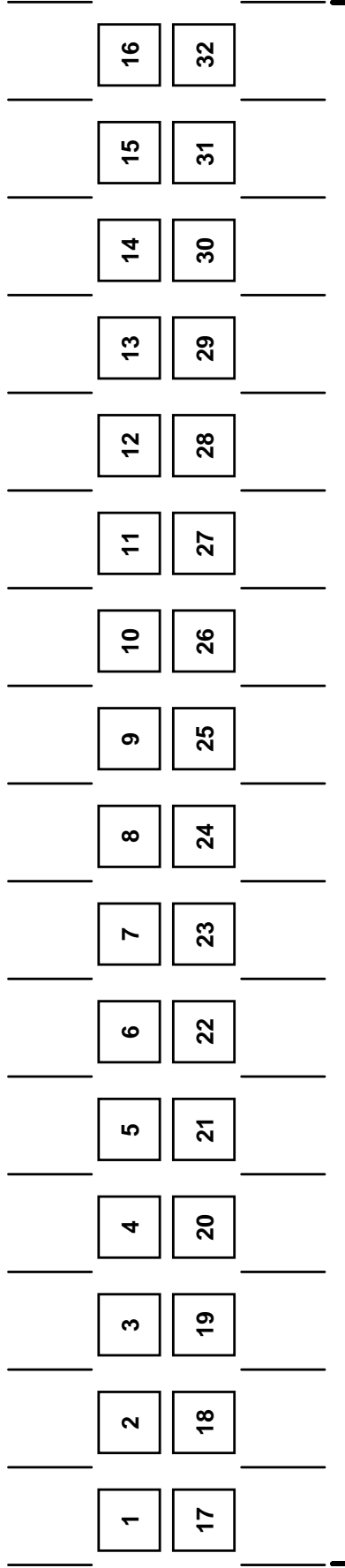
Preset # 3 Title: Weekly status mtg Video:            Audio:             
 Fill in the preset number and use colors, dashes, etc., to make connecting lines.  
 Indicate if the configuration is for video, audio, or both.

**Figure 46. Worksheet Example 3: Test Configuration**

Input sources



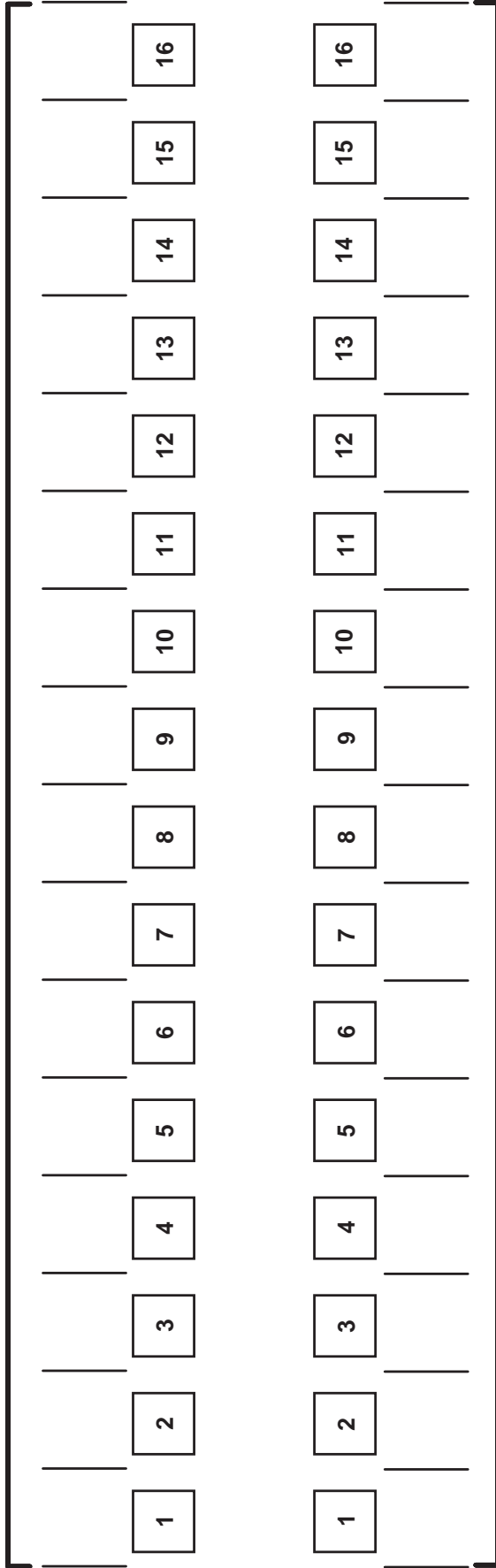
Output destinations



Preset # \_\_\_\_\_ Title: \_\_\_\_\_ Video: \_\_\_\_\_ Audio: \_\_\_\_\_  
 Fill in the preset number and use colors, or dashes, etc. to make connecting lines.  
 Indicate if the configuration is for Video, Audio, or both.

**32-button Switchers Configuration Worksheet**

Input sources



Preset # \_\_\_\_\_ Title: \_\_\_\_\_ Video: \_\_\_\_\_ Audio: \_\_\_\_\_

Fill in the preset number and use colors, or dashes, etc. to make connecting lines.

Indicate if the configuration is for video, audio, or both.

### 16-button Switchers Configuration Worksheet

# Programming Guide

This section describes the operation of the MTPX Plus Matrix Switchers via SIS commands, including:

- **Local Host-Control Ports**
- **Ethernet (LAN) Port**
- **Host-to-Switcher Instructions**
- **Switcher-Initiated Messages**
- **Switcher Error Responses**
- **Using the Command/Response Tables**
- **Command/Response Table for SIS Commands**
- **Command Response Table for IP-specific SIS Commands**
- **Special Characters**

## Local Host-Control Ports

The switcher has two local ports that can be directly connected to a host device such as a computer running the Extron DataViewer utility or the HyperTerminal utility, an RS-232 capable PDA, or a control system. These ports make remote control of the switcher possible using a direct connection. The local ports are:

- NOTES:**
- The rear panel and front panel ports are independent of one another. A front panel Configuration port connection and a rear panel Remote port connection can be active at the same time.
  - The serial port protocol of both Remote ports and the 2.5 mm stereo jack Configuration port is:
    - 9600 baud
    - No parity
    - 8-bit
    - No flow control
    - 1 stop bit
  - See “[Selecting the Rear Panel Remote Port Protocol and Baud Rate](#)”, in the “Operation” section to configure the rear panel Remote port from the front panel.
  - Extron recommends leaving the serial ports at 9600 baud only.

- The rear panel Remote (serial) port (see “[Remote Connection](#)” in the “Installation” section)
  - **MTPX Plus 128** — An RS-232 **only** port, a 3-pole captive screw connector
  - **All other MTPX Plus models** — An RS-232 / RS-422 port, a 9-pin D female connector
- The front panel Configuration port (see “[Front Panel Configuration Port](#)” in the “Installation” section)
  - **MTPX Plus 128** — A mini USB B port. A standard USB cable and the Extron DataViewer utility, version 2.0 or newer, can be used for connection to the Configuration port.

**NOTE:** Before you use the MTPX Plus 128 Configuration (USB) port for the first time, you need to install and activate the USB driver on your computer. The simplest way to do this is to install version 8.0 or newer of the Matrix Switchers Control Program and then run the Found New Hardware Wizard (see “[Installing the Software](#)” and “[Activating a USB port for the first time](#)” in the “Matrix Software” section).

- **All other MTPX Plus models** — A 2.5 mm mini stereo jack (RS-232 **only**) port

**NOTE:** The optional 9-pin D to 2.5 mm mini jack TRS RS-232 cable, part #70-335-01 can be used for connection to the Configuration port.

## Ethernet (LAN) Port

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (see “[Ethernet Connection](#)” in the “Installation” section).

- **Crossover cable** — Direct connection between the computer and the MTPX Plus switcher.
- **Patch (straight-through) cable** — Connection of the MTPX Plus switcher to an Ethernet LAN.

### Default IP addresses

To access the MTPX Plus switcher via the LAN port, you need the IP address for the unit, and may need the subnet mask and the gateway address. If the IP address has been changed to an address comprised of words and characters, you can determine the actual numeric IP address using the ping (ICMP) utility (see “[Ethernet Link](#)” on page 146 for more details). If the addresses have not been changed, the factory-specified defaults are:

- **IP address**            192.168.254.254    • **Subnet mask**        255.255.0.0
- **Gateway address**   0.0.0.0

### Establishing a Connection

Establish a network connection to an MTPX Plus switcher as follows:

1. Open a TCP socket to port 23 using the IP address of the switcher.

**NOTE:** If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.

The switcher responds with a copyright message including the date, the name of the product, firmware version, part number, and the current date/time.

**NOTES:**

- If the switcher is **not** password-protected, the device is ready to accept SIS commands immediately after it sends the copyright message.
- If the switcher **is** password-protected, a **password** prompt appears below the copyright message.

2. If the switcher is password protected, enter the appropriate administrator or user password.

If the password is accepted, the switcher responds with `Login User` or `Login Administrator`.

If the password is not accepted, the `Password` prompt reappears.

### Connection Timeouts

The Ethernet link times out after a designated period of time of no communications. By default, this timeout value is set to five minutes but the value can be changed. See the [Configure port timeout](#) SIS commands on page 95.

**NOTE:** Extron recommends leaving the default timeout at 5 minutes and periodically issuing the Query (Q) command to keep the connection active. If there are long idle periods, Extron recommends disconnecting the socket and reopening the connection when another command must be sent.

## Number of Connections

An MTPX Plus switcher can have up to 200 simultaneous TCP connections, including all http sockets and telnet connections. When the connection limit is reached, the switcher accepts no new connections until some have been closed. No error message or indication is given that the connection limit has been reached. To maximize performance of an IP Link device, the number of connections should stay low and unnecessary open sockets should be closed.

## Using Verbose Mode

Telnet connections to an MTPX Plus switcher can be used to monitor for changes that occur on the switcher, such as front panel operations and SIS commands from other telnet sockets or a serial port. For a telnet session to receive change notices from the switcher, the telnet session must be in verbose mode 1 or 3. See the **Verbose Mode** SIS command on page 95. In verbose mode 3, the telnet socket reports changes in messages that resemble SIS command responses.

## Host-to-Switcher Instructions

The switcher accepts SIS (Simple Instruction Set) commands through the RS-232 port. SIS commands consist of one or more characters per command field. They do not require any special characters to begin or end the command character sequence. Each switcher response to an SIS command ends with a carriage return and a line feed (CR/LF = **↵**), which signals the end of the response character string. A string is one or more characters.

## Switcher-initiated Messages

When a local event such as a front panel operation or an IR 501 command string occurs, the switcher responds by sending a message to the host. The switcher-initiated messages are listed below (underlined).

The switcher does not expect a response from the host, but, for example, the host program might request a new status.

(C) COPYRIGHT 20yy, Extron Electronics MTPX, Vx.xx,  
60-*nnn*-01 {*day,date,time*}↵

The switcher initiates the copyright message when it is first powered on or when a connection via Internet protocol (IP) is established. Vx.xx is the firmware version number and 60-*nnnn*-01 is the switcher part number.

**NOTE:** {Day, date, time} are only reported if the connection is via the LAN port.

Password:↵

The switcher initiates the password message immediately after the copyright message when the controlling system is connected using TCP/IP or Telnet and the switcher is password protected. This message means that the switcher requires an administrator or user level password before it will perform the commands entered via this link. The switcher repeats the password message response for every entry other than a valid password until a valid password is entered.

↵Login Administrator↵

↵Login User↵

The switcher initiates the login message when a correct administrator or user password has been entered. If the user and administrator passwords are the same, the switcher defaults to administrator privileges.

### Qik↵

The switcher initiates the Qik message when a front panel tie creation has occurred.

### Sprnn↵

The switcher initiates the Spr message when a memory preset has been saved from the front panel. "nn" is the preset number.

### Rprnn↵

The switcher initiates the Rpr message when a memory preset has been recalled from the front panel. "nn" is the preset number.

### Innn•Audxx↵

The switcher initiates the Aud message when a front panel input audio level change has occurred. "n" is the input number and "xx" is the dB level.

### Outnn•Volxx↵

The switcher initiates the Vol message when a front panel output audio volume change has occurred. nn is the output number and xx is the volume level.

### Amtnn\*x↵

The switcher initiates the Amt message when an audio or RS-232 output mute is toggled on or off from the front panel. nn is the output number and x is the mute status: 1 = on, 0 = off.

### Exen↵

The switcher initiates the Exe message when the front panel security lockout (executive mode) is toggled on or off from the front panel. "n" is the executive mode: 0, 1, or 2.

## Switcher Error Responses

When the switcher receives an SIS command and determines that it is valid, it performs the command and sends a response to the host device. If the switcher is unable to perform the command because the command is invalid or contains invalid parameters, the switcher returns an error response to the host. The error response codes are:

E01 — Invalid input channel number (out of range)

E10 — Invalid command

E11 — Invalid preset number (out of range)

E12 — Invalid output number (out of range)

E13 — Invalid value (out of range)

E14 — Invalid command for this configuration

E17 — Timeout (caused only by direct write of global presets)

E21 — Invalid room number

E22 — Busy

E24 — Privileges violation (Users have access to all view and read commands (other than the administrator password), and can create ties, presets, and audio or RS-232 mutes)

E25 — Device not present

E26 — Maximum number of connections exceeded

E27 — Invalid event number

E28 — Bad filename / file not found





<b>X15</b> = TP output number	01 – (maximum number of TP outputs for your model)
<b>X16</b> = Local video output number	1 or 2

**NOTE:** **X16** is applicable to MTPX Plus 128 and matrix sizes 1632 and larger only.

<b>X17</b> = Local output sync polarity	0 = H- / V- (default) 1 = H+ / V- 2 = H- / V+	3 = H+ / V+ 4 = No sync processing (composite, S-video, YUV)
<b>X18</b> = Local audio output number	1 – 2 (MTPX Plus 128) 1 – 4 (other matrix sizes 1616 and smaller) 1 – 8 (matrix sizes 1632 and larger)	
<b>X19</b> = Volume adjustment range	0 – 64 (1 dB/step except for 0-to-1, which is 13 dB) (default = 64 [0 dB]) (See the table on page 84.)	
<b>X20</b> = Audio gain	0 – 24 (1 dB/step)	
<b>X21</b> = Numeric dB value	–18 to +24 (45 steps of gain or attenuation) (Default = 0 dB)	
<b>X22</b> = Audio attenuation	1 – 18 (1 dB/step)	
<b>X23</b> = Global or room preset #	00 - 32 (global) or 00-10 (room) (0 = current configuration)	

**NOTE:** A Room preset is a stored configuration with all of the outputs assigned to a single room. When a room preset is recalled from memory, it becomes the current configuration.

<b>X24</b> = Name	12 characters maximum for input, output, and global preset names 11 characters maximum for room preset names Upper- and lower-case alphanumeric characters and _ / and spaces are valid.
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**NOTE:** The HTML language reserves certain characters for specific functions (see “Special Characters” on page 95).

<b>X25</b> = Room # (for room presets)	10 max. (each can have up to 10 presets ( <b>X23</b> s) assigned)
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**NOTE:** A Room is a subset of operator-selected outputs that relate to each other. The MTPX Plus switchers support up to 10 rooms, each of which can consist of from 1 to 16 outputs.


<b>X26</b> = Group # (for I/O grouping)	1 through 4 groups (0 = no group)	
<b>X27</b> = Audio or RS-232 mute:	0 = no mutes	2 = audio or RS-232 mute
<b>X28</b> = Local input select DIP switch status	0 = RJ-45 position	1 = local input position
<b>X29</b> = Number of inputs	8, 12, 16, or 32	
<b>X30</b> = Number of outputs	8, 16, or 32	
<b>X31</b> = Part number	60- <i>nnn-nn</i> or 60- <i>nnnn-nn</i>	
<b>X32</b> = Firmware version number to second decimal place ( <i>x.xx</i> )		
<b>X33</b> = Verbose firmware version-description-upload date/time (see the <b>Query firmware version (verbose)</b> command on page 91).		
<b>X34</b> = Voltage	Positive or negative voltage and magnitude	
<b>X35</b> = Internal temperature	Degrees Fahrenheit	
<b>X36</b> = Fan speed	RPM	

## Command and Response Table for SIS Commands

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>Create Ties</b>			
<b>NOTES:</b> <ul style="list-style-type: none"> <li>Commands can be entered back-to-back in a string, with no spaces. For example: 1*1!02*02&amp;003*003%4*8\$.</li> <li>The quick multiple tie and tie input to all output commands activate all I/O switches simultaneously.</li> <li>The matrix switchers support 1-, 2-, and 3-digit numeric entries (1*1, 02*02, or 001*001).</li> <li>The &amp; tie command for RGB and the % tie command for video can be used interchangeably on the matrix switchers).</li> </ul>			
Tie input $\boxed{x1}$ to output $\boxed{x2}$ , video (V) and audio (A) <i>Example:</i>	$\boxed{x1}*\boxed{x2}!$ 1*3!	Out $\boxed{x2}$ •In $\boxed{x1}$ •A11← Out03•In01•A11←	Tie the video and audio for input $\boxed{x1}$ to output $\boxed{x2}$ . Tie input 1 video and audio to output 3.
Tie input $\boxed{x1}$ to output $\boxed{x2}$ , RGB (video) only <i>Example (see last Note bullet, above):</i>	$\boxed{x1}*\boxed{x2}\&$ 10*4&	Out $\boxed{x2}$ •In $\boxed{x1}$ •RGB← Out04•In10•RGB←	Audio breakaway. Tie input 10 RGB to output 4.
Tie input $\boxed{x1}$ to output $\boxed{x2}$ , video only <i>Example (see last Note bullet, above):</i>	$\boxed{x1}*\boxed{x2}\%$ 7*5%	Out $\boxed{x2}$ •In $\boxed{x1}$ •Vid← Out05•In07•Vid←	Audio breakaway. Tie input 7 video to output 5.
Tie input $\boxed{x1}$ to output $\boxed{x2}$ , audio only <i>Example:</i>	$\boxed{x1}*\boxed{x2}\$$ 12*4\$	Out $\boxed{x2}$ •In $\boxed{x1}$ •Aud← Out04•In12•Aud←	Audio breakaway. Tie input 12 audio to output 4.
Quick multiple tie <i>Example:</i>	$\text{Esc}+Q\boxed{x1}*\boxed{x2}! \dots \boxed{x1}*\boxed{x2}\$ \leftarrow$ $\text{Esc}+Q3*4!3*5\%3*6\$ \leftarrow$	Qik← Qik←	Tie input 3 video and audio to output 4, tie input 3 video to output 5, and tie input 3 audio to output 6.
Tie input to all outputs, video and audio <i>Example:</i>	$\boxed{x1}*!$ 5*!	In $\boxed{x1}$ •A11← In05•A11←	Tie input 5 video and audio to all outputs.
<b>NOTE:</b> 0*! clears all ties.			
Tie input to all outputs, RGB (video) only <i>Example (see last Note bullet, above):</i>	$\boxed{x1}* \&$ 8* &	In $\boxed{x1}$ •RGB← In08•RGB←	Audio breakaway. Tie input 8 RGB to all outputs.
Tie input to all outputs, video only <i>Example (see last Note bullet, above):</i>	$\boxed{x1}* \%$ 10* %	In $\boxed{x1}$ •Vid← In10•Vid←	Audio breakaway. Tie input 10 video to all outputs.
Tie input to all outputs, audio only	$\boxed{x1}* \$$	In $\boxed{x1}$ •Aud←	Audio breakaway.
<b>Read ties</b>			
<b>NOTE:</b> The & read tie command for RGB and the % read tie command for video can be used interchangeably on the matrix switchers.			
Read RGB (video) output tie	$\boxed{x2}\&$	$\boxed{x1}\leftarrow$	RGB input $\boxed{x1}$ is tied to output $\boxed{x2}$ .
Read video output tie	$\boxed{x2}\%$	$\boxed{x1}\leftarrow$	Video input $\boxed{x1}$ is tied to output $\boxed{x2}$ .
Read audio output tie	$\boxed{x2}\$$	$\boxed{x1}\leftarrow$	udio input $\boxed{x1}$ is tied to output $\boxed{x2}$ .

**NOTE:**  $\boxed{x1}$  = Input number                      00 – (maximum number of inputs for your model) (00 = untied)  
 $\boxed{x2}$  = Output number                            01 – (maximum number of outputs for your model)

## Command/Response Table for SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description														
<b>Audio/RS-232 TP input (wire pair 3 and 6) configuration</b>																	
<b>NOTE:</b> The RS-232 output insert ports, when enabled ( <code>[Esc][X5]*1Lrpt←</code> ), override the audio/RS-232 TP input configurations. For the MTPX Plus 128, these commands are valid for inputs 5 through 12 only.																	
Configure input as audio	<code>[X8]*0\</code>	<code>Typ[X8]*0←</code>	Define the audio/RS-232 input as audio, such as provided by an MTP 15HD A transmitter.														
Configure input as RS-232	<code>[X8]*1\</code>	<code>Typ[X8]*1←</code>	Define the audio/RS-232 input as serial communications, such as provided by an MTP 15HD RS transmitter.														
Read TP input configuration	<code>[X8]\</code>	<code>[X4]←</code>	Show the audio/RS-232 wire pair input definition.														
<b>RS-232 output inserts enable</b>																	
Disable an RS-232 output insert port	<code>[Esc][X5]*0Lrpt←</code>	<code>Lrpt[X5]*0←</code>	Disable the RS-232 insert on the <code>[X5]</code> output.														
Enable an RS-232 output insert port	<code>[Esc][X5]*1Lrpt←</code>	<code>Lrpt[X5]*1←</code>	Enable the RS-232 insert on the <code>[X5]</code> output.														
Read RS-232 output insert status	<code>[Esc][X5]Lrpt←</code>	<code>[X6]←</code>	Show the status of the RS-232 output insert.														
<b>Input signal level/peaking and auto calibrate</b>																	
Set input signal level	<code>[Esc][X8]*[X7]Ipek←</code>	<code>Ipek[X8]*[X7]←</code>	Set a specific pre-peak level for the TP input.														
Increment input peaking	<code>[Esc][X8]+Ipek←</code>	<code>Ipek[X8]*[X7]←</code>	Increase the input pre-peaking level by 1														
Decrement input peaking	<code>[Esc][X8]-Ipek←</code>	<code>Ipek[X8]*[X7]←</code>	Decrease the pre-peaking level by 1.														
Read input peaking setting	<code>[Esc][X8]Ipek←</code>	<code>[X7]←</code>															
Execute auto calibration	<code>[Esc][X8]*0AADJ←</code>	<code>Aadj[X8]*2←</code> {start} <code>Qik←</code> {tie creation} <code>Aadj[X8]*[X9]←</code> {finished} <code>Ipek[X8]*[X7]←</code> {new value}	Tie input <code>[X8]</code> to output 1 and auto adjust the peaking on input <code>[X8]</code> . The <code>[X9]</code> value in the response reports whether the adjustment value was within or outside of the threshold.														
<b>NOTES:</b> <ul style="list-style-type: none"> <li>Before issuing the auto calibration command:               <ol style="list-style-type: none"> <li>Disconnect the power and RJ-45 cables at the MTP transmitter connected to <code>[X8]</code>.</li> <li>Connect the two cables to the MTP signal generator (included with most models, optional for the MTPX Plus 128).</li> <li>If the input cable is longer than 300 feet (90 m), place the Pre-Peak switch on the MTP signal generator to on (up when the RJ-45 connector on the signal generator is to the right as shown at right). If the cable is shorter than 300 feet (90 m), place the switch down.</li> </ol> </li> <li>The MTP signal generator does not work on cable lengths over 400 feet (120 m). Set the level/peaking to its maximum value of 255.</li> </ul>																	
																	
<b>NOTE:</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"><code>[X3]</code> = TP input number</td> <td>01 – (maximum number of TP inputs for your model)</td> </tr> <tr> <td><code>[X4]</code> = Audio/RS-232 wire pair input type</td> <td>0 = audio 1 = RS-232</td> </tr> <tr> <td><code>[X5]</code> = RS-232 output insert port</td> <td>MTPX Plus 128, 168, 816, 1616      01 – 08 MTPX Plus 1632, 3216, 3232      01 – 16</td> </tr> <tr> <td><code>[X6]</code> = RS-232 output insert status</td> <td>0 = disabled 1 = enabled</td> </tr> <tr> <td><code>[X7]</code> = Input signal level/peaking range</td> <td>000 – 255</td> </tr> <tr> <td><code>[X8]</code> = Input number</td> <td>01 – (maximum number of inputs for your model)</td> </tr> <tr> <td><code>[X9]</code> = Threshold</td> <td>0 = outside of threshold      1 = within threshold</td> </tr> </table>				<code>[X3]</code> = TP input number	01 – (maximum number of TP inputs for your model)	<code>[X4]</code> = Audio/RS-232 wire pair input type	0 = audio 1 = RS-232	<code>[X5]</code> = RS-232 output insert port	MTPX Plus 128, 168, 816, 1616      01 – 08 MTPX Plus 1632, 3216, 3232      01 – 16	<code>[X6]</code> = RS-232 output insert status	0 = disabled 1 = enabled	<code>[X7]</code> = Input signal level/peaking range	000 – 255	<code>[X8]</code> = Input number	01 – (maximum number of inputs for your model)	<code>[X9]</code> = Threshold	0 = outside of threshold      1 = within threshold
<code>[X3]</code> = TP input number	01 – (maximum number of TP inputs for your model)																
<code>[X4]</code> = Audio/RS-232 wire pair input type	0 = audio 1 = RS-232																
<code>[X5]</code> = RS-232 output insert port	MTPX Plus 128, 168, 816, 1616      01 – 08 MTPX Plus 1632, 3216, 3232      01 – 16																
<code>[X6]</code> = RS-232 output insert status	0 = disabled 1 = enabled																
<code>[X7]</code> = Input signal level/peaking range	000 – 255																
<code>[X8]</code> = Input number	01 – (maximum number of inputs for your model)																
<code>[X9]</code> = Threshold	0 = outside of threshold      1 = within threshold																



## Command/Response Table for SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>Local video output sync polarity</b>			
<b>NOTE:</b> The command structure differs, depending on the size of the matrix. Matrix sizes 816, 168, and 1616 do not need the local output variable ( <u>X16</u> ). Matrix sizes 128, 1632, 3216, and 3232 require the variable.			
Set local output polarity (matrix size 816, 168, and 1616) <i>Example:</i>	<u>Esc</u> <u>X17</u> Opol ← <u>Esc</u> 00pol ←	Opol <u>X17</u> ← Opol0 ←	Set the horizontal and vertical sync polarity for a local output. Set the local output to output negative horizontal and vertical sync.
Set local output polarity (matrix size 128, 1632, 3216, and 3232) <i>Example:</i>	<u>Esc</u> <u>X16</u> * <u>X17</u> Opol ← <u>Esc</u> 2*00pol ←	Opol <u>X16</u> * <u>X17</u> ← Opol2*0 ←	Set the horizontal and vertical sync polarity for local output <u>X16</u> . Set local output 2 to output negative horizontal and vertical sync.
Read local output sync settings (matrix size 816, 168, and 1616)	<u>Esc</u> Opol ←	<u>X17</u> ←	
Read local output sync settings (matrix size 128, 1632, 3216, and 3232)	<u>Esc</u> <u>X16</u> Opol ←	<u>X17</u> ←	
<b>Output skew adjustment</b>			
Set all output skew adjustment values <i>Example:</i>	<u>Esc</u> <u>X2</u> * <u>X10</u> * <u>X10</u> * <u>X10</u> Oseq ← <u>Esc</u> 2*0*0*40seq ←	Oseq <u>X2</u> * <u>X10</u> * <u>X10</u> * <u>X10</u> ← Oseq02*0*0*4 ←	Set a specific skew adjustment for the TP output. <u>X10</u> values are listed in RGB order. Set the output 2 skew settings as follows: Red = 0 ns Green = 0 ns Blue = 8 ns (delayed 8 ns).
Increment one output skew adjustment value	<u>Esc</u> <u>X2</u> * <u>X11</u> +Oseq ←	Oseq <u>X2</u> * <u>X10</u> * <u>X10</u> * <u>X10</u> ←	Increase the <u>X11</u> plane skew adjustment output <u>X2</u> by 1 step (2 ns).
Decrement one output skew adjustment value <i>Example:</i>	<u>Esc</u> <u>X2</u> * <u>X11</u> -Oseq ← <u>Esc</u> 2*2-Oseq ←	Oseq <u>X2</u> * <u>X10</u> * <u>X10</u> * <u>X10</u> ← Oseq02*0*0*3 ←	Decrease the <u>X11</u> plane skew adjustment output <u>X2</u> by 1 step (2 ns). Decrease the output 2 blue skew by 2 ns to 6 ns.
Read output skew adjustment values	<u>Esc</u> <u>X2</u> Oseq ←	<u>X10</u> * <u>X10</u> * <u>X10</u> ←	

**NOTE:** X2 = Output number  
X10 = Skew adjustment range  
X11 = Video plane  
X16 = Local video output number  
X17 = Local output sync polarity

01 – (maximum number of outputs for your model)  
00 – 31 (each step = 2ns)  
0 = red  
1 = green  
2 = blue  
1 or 2 (X1^ applies to matrix sizes 128, 1632, 3216, and 3232 only)  
0 = H- / V- (default)  
1 = H+ / V-  
2 = H- / V+  
3 = H+ / V+  
4 = No sync processing (composite, S-video, YUV)

## Command/Response Table for SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description					
<b>Audio output volume</b>								
<b>NOTE:</b> The table below the commands defines the value of each audio volume step.								
Set the audio volume to a specific value <i>Example:</i>	$\text{X18} * \text{X19} \text{V}$ 1 * 50v	Out $\text{X18}$ •Vol $\text{X19}$ ←← Out01•Vol150←←	Set output 1 volume to 79%.					
Increment volume <i>Example:</i>	$\text{X18} + \text{V}$ 1 + V	Out $\text{X18}$ •Vol $\text{X19}$ ←← Out01•Vol151←←	Increment volume by 1 step.					
Decrement volume	$\text{X18} - \text{V}$	Out $\text{X18}$ •Vol $\text{X19}$ ←←	Decrease volume by 1 step.					
Read output volume	$\text{X18} \text{V}$	$\text{X19}$ ←←						
$\text{X19}$ value	dB of attenuation	Output volume	$\text{X19}$ value	dB of attenuation	Output volume	$\text{X19}$ value	dB of attenuation	Output volume
00	76	0%						
01	63	5.5%	23	41	38.5%	45	19	71.5%
02	62	7%	24	40	40%	46	18	73%
03	61	8.5%	25	39	41.5%	47	17	74.5%
04	60	10%	26	38	43%	48	16	76%
05	59	11.5%	27	37	44.5%	49	15	77.5%
06	58	13%	28	36	46%	50	14	79%
07	57	14.5%	29	35	47.5%	51	13	80.5%
08	56	16%	30	34	49%	52	12	82%
09	55	17.5%	31	33	50.5%	53	11	83.5%
10	54	19%	32	32	52%	54	10	85%
11	53	20.5%	33	31	53.5%	55	9	86.5%
12	52	22%	34	30	55%	56	8	88%
13	51	23.5%	35	29	56.5%	57	7	89.5%
14	50	25%	36	28	58%	58	6	91%
15	49	26.5%	37	27	59.5%	59	5	92.5%
16	48	28%	38	26	61%	60	4	94%
17	47	29.5%	39	25	62.5%	61	3	95.5%
18	46	31%	40	24	64%	62	2	97%
19	45	32.5%	41	23	65.5%	63	1	98.5%
20	44	34%	42	22	67%	64	0	100%
21	43	35.5%	43	21	68.5%			
22	42	37%	44	20	70%			
<b>NOTE:</b> $\text{X18}$ = Local audio output number				1 – 2 (MTPX Plus 128) 1 – 4 (other matrix sizes 1616 and smaller) 1 – 8 (matrix sizes 1632 and larger)				
$\text{X19}$ = Volume adjustment range				0 – 64 (1 dB/step except for 0-to-1, which is 13 dB)				

## Command/Response Table for SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>Audio input gain and attenuation</b>			
<b>NOTE:</b> The set gain (G) and set attenuation (g) commands are case sensitive.			
Set audio input gain to +dB value <i>Example:</i>	$\boxed{X1} * \boxed{X20} G$ 1 * 2G	In $\boxed{X1}$ •Aud $\boxed{X21}$ ← In1•Aud+02←	Set input 1 audio gain to +2 dB.
Set audio input attenuation to -dB value	$\boxed{X1} * \boxed{X22} g$	In $\boxed{X1}$ •Aud $\boxed{X21}$ ←	
Increment gain <i>Example:</i>	$\boxed{X1} + G$ 5 + G	In $\boxed{X1}$ •Aud $\boxed{X21}$ ← In5•Aud+03←	Increase gain by 1 dB. Increase audio input 5 level from +2 dB to +3 dB.
Decrement gain <i>Example:</i>	$\boxed{X1} - G$ 7 - G	In $\boxed{X1}$ •Aud $\boxed{X21}$ ← In7•Aud - 09←	Decrease gain by 1 dB. Decrease audio input 7 level from -8 dB to -9 dB.
Read input gain <i>Example:</i>	$\boxed{X1} G$ 3G	$\boxed{X21}$ ← -06←	Audio input 3 level is at -6 dB.
<b>Audio or RS-232 mute commands</b>			
Audio or RS-232 mute	$\boxed{X2} * 1 Z$	Amt $\boxed{X2}$ *1←	Mute output $\boxed{X2}$ audio or RS-232 (audio off).
Audio or RS-232 unmute	$\boxed{X2} * 0 Z$	Amt $\boxed{X2}$ *0←	Unmute output $\boxed{X2}$ audio or RS-232 (audio on).
Read audio or RS-232 mute	$\boxed{X2} Z$	$\boxed{X13}$ ←	1 = mute on, 0 = mute off.
Global audio or RS-232 mute	1 * Z	Amt1←	Mute all audio or RS-232 outputs.
Global audio or RS-232 unmute	0 * Z	Amt0←	Unmute all audio or RS-232 outputs.
<b>Names</b>			
<b>NOTE:</b> The HTML language reserves certain characters for specific functions (see “Special Characters” on page 95).			
Write global preset name <i>Example:</i>	$\boxed{Esc} \boxed{X23}, \boxed{X24} NG \leftarrow$ $\boxed{Esc} 1, Security\ 1 NG \leftarrow$	Nmg $\boxed{X23}, \boxed{X24}$ ← Nmg01, Security 1←	Name global preset 1 “Security 1”.
Read global preset name <i>Example:</i>	$\boxed{Esc} \boxed{X23} NG \leftarrow$ $\boxed{Esc} 2 NG \leftarrow$	$\boxed{X24}$ ← Security 2←	
Write room preset name <i>Example:</i>	$\boxed{Esc} \boxed{X25} * \boxed{X23}, \boxed{X24} NP \leftarrow$ $\boxed{Esc} 1 * 3, Podium\_DVD NP \leftarrow$	Nmp $\boxed{X25} * \boxed{X23}, \boxed{X24}$ ← Nmp01*3, Podium_DVD←	Name room 1, preset 3 “Podium_DVD”.
Read room preset name	$\boxed{Esc} \boxed{X25}, \boxed{X23} NP \leftarrow$	$\boxed{X24}$ ←	
<b>NOTES:</b>			
• If a preset is unassigned, the $\boxed{X24}$ displays [unassigned].			
• If a global preset is saved, but not yet named, the default name is Preset $\boxed{X23}$ .			
• If a room preset is saved, but not yet named, the default name is Rm $\boxed{X25}$ Prst $\boxed{X23}$ .			
<b>NOTE:</b>			
$\boxed{X1}$ = Input number	01 – (maximum number of inputs for your model)		
$\boxed{X2}$ = Output number	01 – (maximum number of outputs for your model)		
$\boxed{X8}$ = Input number	01 – (maximum number of inputs for your model)		
$\boxed{X13}$ = Mute	0 = off 1 = on		
$\boxed{X20}$ = Audio gain	0 – 24 (1 dB/step)		
$\boxed{X21}$ = Numeric dB value	-18 to +24 (45 steps of gain or attenuation) (Default = 0 dB)		
$\boxed{X22}$ = Audio attenuation	1 – 18 (1 dB/step)		
$\boxed{X23}$ = Global or room preset #	01 - 32, 10 maximum for a room preset		
$\boxed{X24}$ = Name	11 characters for room preset names		
$\boxed{X25}$ = Room # (for room presets)	10 max. (each can have up to 10 presets (X2#s) assigned)		



## Command/Response Table for SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>Names (continued)</b>			
Write input name	<code>Esc</code> <code>X8</code> , <code>X24</code> <code>NI</code> ←	<code>Nmi</code> <code>X8</code> , <code>X24</code> ←	
Example:	<code>Esc</code> 1, Podium cam <code>NI</code> ←	<code>Nmi</code> 01, Podium cam ←	Name input 1 "Podium cam".
Read input name	<code>Esc</code> <code>X8</code> <code>NI</code> ←	<code>X24</code> ←	
Write output name	<code>Esc</code> <code>X2</code> , <code>X24</code> <code>NO</code> ←	<code>Nmo</code> <code>X2</code> , <code>X24</code> ←	
Example:	<code>Esc</code> 1, Main PJ1 <code>NO</code> ←	<code>Nmo</code> 01, Main PJ1 ←	Name output 1 "Main PJ1".
Read output name	<code>Esc</code> <code>X2</code> <code>NO</code> ←	<code>X24</code> ←	
<b>I/O Grouping</b>			
<b>NOTE:</b> The group that is assigned in each of the following I/O grouping commands ( <code>X26</code> ) must be 1, 2, 3, 4, or 0 (not grouped).			
Write input grouping	<code>Esc</code> <code>X26</code> <code>X26</code> <sup>2</sup> ... <code>X26</code> <sup>n</sup> <code>I</code> ←	<code>Gri</code> <code>X26</code> <code>X26</code> <sup>2</sup> <code>X26</code> <sup>3</sup> ... <code>X26</code> <sup>n</sup> ←	<i>n</i> = the maximum number of inputs. Each <code>X26</code> entry is the group number assigned to an input position, starting from input 1.
Example: MTPX Plus 168	<code>E4</code> 0133000004440443 <code>I</code> ←	<code>Gri</code> 40133000004440443 ← (see below)	
	Input 1 in group 4 Input 2 not grouped Input 12 in group 4	Input 1 - Group 4, Input 2 - Group 0 (not grouped), ... Input 16 - Group 3.	
	Response #s = group: <code>Gri</code> 4 0 1 3 3 0 0 0 0 4 4 4 0 4 4 3 ←	Input: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16	
<b>NOTE:</b> You must enter an <code>X26</code> value for each input in your matrix size, such as 32 inputs for an MTPX Plus 3216.			
Write output grouping	<code>E</code> <code>X26</code> <code>X26</code> <sup>2</sup> ... <code>X26</code> <sup>n</sup> <code>O</code> ←	<code>Gro</code> <code>X26</code> <code>X26</code> <sup>2</sup> <code>X26</code> <sup>3</sup> ... <code>X26</code> <sup>n</sup> ←	<i>n</i> = the maximum number of outputs. Each <code>X26</code> entry is the group number assigned to an output position, starting from output 2.
Read input grouping	<code>EI</code> ←	<code>X26</code> <code>X26</code> <sup>2</sup> <code>X26</code> <sup>3</sup> ... <code>X26</code> <sup>n</sup> ←	<i>n</i> = the maximum number of inputs. Each <code>X26</code> entry is the group number assigned to an output position, starting from input 1.
Example: MTPX Plus 1616	<code>EI</code> ←	111133000004440444 ← (see below)	
	Input 1 in group 1 Input 8 not grouped Input 12 in group 4		
	Response = group: <code>1</code> 1 1 3 3 0 0 0 0 4 4 4 0 4 4 4 ←	Input: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16	
Read output grouping	<code>E0</code> ←	<code>X26</code> <code>X26</code> <sup>2</sup> <code>X26</code> <sup>3</sup> ... <code>X26</code> <sup>n</sup> ←	<i>n</i> = the maximum number of outputs.
<b>Save, recall, and directly write global presets</b>			
<b>NOTE:</b> If you try to recall a preset that is not saved, the matrix switcher responds with the error code E11.			
Save current configuration as a global preset	<code>X23</code> ,	<code>Spr</code> <code>X23</code> ←	Command character is a comma.
Example:	8,	<code>Spr</code> 08 ←	Save current ties as preset 8.
Recall a global preset	<code>X23</code> .	<code>Rpr</code> <code>X23</code> ←	Command character is a period.
Example:	5.	<code>Rpr</code> 05 ←	Recall preset 5, which becomes the current configuration.

**NOTE:** `X2` = Output number                      01 – (maximum number of outputs for your model)  
`X8` = Input number                            01 – (maximum number of inputs for your model)  
`X23` = Global or room preset #            01 - 32, 10 maximum for a room preset  
`X25` = Room # (for room presets)        10 max. (each can have up to 10 presets (`X23`s) assigned)  
`X26` = Group #                                1 through 4 groups (0 = no group)

## Command/Response Table for SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>Save, recall, and directly write global presets (continued)</b>			
<i>Direct write process —</i>			
<p><b>NOTE:</b> The direct write of a global preset should always be preceded by a clear global preset ties command of that same preset number, as shown below. In a directly-written preset, the input for each output position (or no tied input) remains unchanged unless overwritten or cleared. If you do not <b>clear</b> the ties in a global preset number <u>before</u> you directly <b>write</b> a global preset to that number, ties that are part of the previous version of the specified preset with the same number can unexpectedly become part of the newly-created preset.</p>			
Clear global preset ties	<code>[Esc]+[X23]P0*!←</code>	<code>Spr[X23]←</code>	Clear all ties in preset <code>[X23]</code> .
Directly write a global preset	<code>[Esc]+[X23]P[X1]*[X2]! [X1]*[X2%][X1]*[X2\$] ... [X1]*[X2]&amp;←</code>	<code>Spr[X23]←</code>	The tie all (!), tie RGB (&), tie video (%), and tie audio (\$) commands are all valid.
<i>Example:</i>	<code>[Esc]+27P0*!←</code> <code>[Esc]+27P12*5!10*09%3*2\$3*8&amp;←</code>	<code>Spr27←</code> <code>Spr27←</code>	Clear all ties in preset 27. <u>Brackets are shown to separate ties for clarity only.</u> Create global preset 27, which ties video and audio input 12 to output 5, video input 10 to output 9, audio input 3 to output 2, and video input 3 to output 8.
Write room outputs	<code>[Esc][X25],[X2]<sup>1</sup>, [X2]<sup>2</sup>, ... [X2]<sup>n</sup>MR←</code>	<code>Mpr[X25],[X2]<sup>1</sup>, [X2]<sup>2</sup>, ... [X2]<sup>n</sup>←</code>	See notes.
<p><b>NOTES:</b></p> <ul style="list-style-type: none"> <li>• A room can contain a maximum of 16 outputs (<code>[X2s]</code>).</li> <li>• An output can belong to only one room.</li> <li>• The maximum number of rooms (<code>[X25s]</code>) is 10.</li> <li>• If no room name is assigned, the default name is "Room #<code>[X25]</code>."</li> </ul>			
<i>Example:</i>	<code>[Esc]8, 3, 04, 5, 6MR←</code>	<code>Mpr8, 03, 04, 05, 06←</code>	Outputs 3, 4, 5, and 6 are assigned to room 8.
Read room outputs	<code>[Esc][X25]MR←</code>	<code>[X23],[X2]<sup>1</sup>, [X2]<sup>2</sup>, ... [X2]<sup>n</sup>←</code>	
<i>Example:</i>	<code>[Esc]3MR←</code>	<code>Class 1, 01, 02, 08, 09←</code>	Outputs 1, 2, 8, and 9 are assigned to room 3, which named "Class 1".
Recall room preset	<code>[X25]*[X23].</code>	<code>Rmm[X25]•Rpr[X23]←</code>	Command character is a period.
Clear room preset ties	<code>[Esc]+[X25]*[X23]P0*!←</code>	<code>Rmm[X25]•Spr[X23]←</code>	Clear all ties in room <code>[X23]</code> preset <code>[X23]</code> .
Directly write a room preset	<code>[Esc]+[X25]*[X23]P[X1]*[X2]! [X1]*[X2%][X1]*[X2\$] ... [X1]*[X2]&amp;←</code>	<code>Rmm[X25]•Spr[X23]←</code>	Enter as many ties as are valid for this model. Tie all (!), tie RGB (&), tie video (%), and tie audio (\$) commands are all valid.
<i>Example:</i>	<code>[Esc]+7*3P12*7&amp;11*5\$4*5%6*6!←</code>	<code>Rmm07•Spr03←</code>	<u>Brackets are shown to separate ties for clarity only.</u> Create preset 3 for room 7, which ties audio input 12 to output 7, video input 11 to output 5, RGB input 4 to output 5, and video and audio input 6 to output 6.
<b>Lock (executive) modes</b>			
<p><b>NOTE:</b> See "<b>Setting the Front Panel Locks (Executive Modes)</b>" in the "Operation" section for more information on the <i>Lock</i> modes.</p>			
Lock all front panel functions	1X	<code>Exe1←</code>	Enable <i>Lock</i> mode 1.
Lock advanced front panel functions	2X	<code>Exe2←</code>	Enable <i>Lock</i> mode 2.
Unlock all front panel functions	0X	<code>Exe0←</code>	Enable <i>Lock</i> mode 0.
View lock status	X	<code>[X13]←</code>	
<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li><code>[X1]</code> = Input number                      01 – (maximum number of inputs for your model)</li> <li><code>[X2]</code> = Output number                    01 – (maximum number of outputs for your model)</li> <li><code>[X13]</code> = Lock mode                        0 = mode 0                                      1 = mode 1                                      2 = mode 2</li> <li><code>[X23]</code> = Global or room preset #        01 - 32, 10 maximum for a room preset</li> <li><code>[X25]</code> = Room # (for room presets)     10 max. (each can have up to 10 presets (X2#s) assigned)</li> </ul>			

## Command/Response Table for SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>Resets</b>			
Reset all input level and peaking adjustments	<b>Esc</b> ZT←	Zpt←	Clear all level and peaking adjustments to their default (0) values.
Reset all input and output skew adjustments	<b>Esc</b> ZK←	Zpk←	Clear all input and output skew values to 0 ns.
Reset global presets and names	<b>Esc</b> ZG←	Zpg←	Clear all global presets and their names.
Reset <b>one</b> global preset	<b>Esc</b> X23ZG←	ZpgX23←	Clear global preset X23.
Reset audio input levels	<b>Esc</b> ZA←	Zpa←	Reset all audio input levels (gain and attenuation) to 0 dB.
Reset audio output levels	<b>Esc</b> ZV←	Zpv←	Reset all audio output levels (volume) to 100% (no attenuation).
Reset all mutes	<b>Esc</b> ZZ←	Zpz←	Reset all audio or RS-232 outputs to unmuted.
Reset room map (outputs)	<b>Esc</b> ZR←	Zpr←	Clear all room definitions.
Reset individual room	<b>Esc</b> X25ZR←	ZprX25←	Delete room X25.
Reset all room presets and names	<b>Esc</b> ZP←	Zpp←	Clear an individual room preset and name.
Reset individual room preset and name	<b>Esc</b> X25*X23ZP←	ZppX25*X23←	Clear an individual room preset and name.
Reset whole switcher	<b>Esc</b> ZXXX←	Zpx←	Clear all ties and presets, reset all audio gains to 0 dB, and reset volume to 100%.
Absolute reset	<b>Esc</b> ZQQQ←	Zpq←	Similar to <b>Reset whole switcher</b> , plus clear the IP address to 192.168.254.254 and subnet mask to 255.255.000.000.
<b>View ties, gain, volume, mutes, presets, and DIP switch status</b>			
Read RGB (video) output tie <i>Example:</i>	X2& 5&	X1← 12←	RGB input X1 is tied to output X2. Input 12 RGB is tied to output 5.
Read video output tie <i>Example:</i>	X2% 7%	X1← Ø2←	RGB input X1 is tied to output X2. Input 2 video is tied to output 7.
Read audio output tie <i>Example:</i>	X2\$ 3\$	X1← Ø6←	Audio input X1 is tied to output X2. Input 6 audio is tied to output 3.
View output volume <i>Example:</i>	X18V 7V	X19← 55←	Volume for output 7 is 55%.
View input gain <i>Example:</i>	X8G 4G	X21← -Ø2←	Audio input 3 level is -2 dB.

**NOTE:**

X1 = Input number	00 – (maximum number of inputs for your model)
X2 = Output number	01 – (maximum number of outputs for your model)
X8 = Input number	01 – (maximum number of inputs for your model)
X18 = Local audio output number	1 – 2 (MTPX Plus 128)
	1 – 4 (matrix sizes 1616 and smaller)
	1 – 8 (matrix sizes 1632 and larger)
X19 = Volume adjustment range	0 – 64 (1 dB/step except for 0-to-1, which is 22 dB)
X21 = Numeric dB value	-18 to +24 (45 steps of gain or attenuation) (Default = 0 dB)
X23 = Global or room preset #	01 - 32 (global) or 01-10 (room)
X25 = Room # (for room presets)	10 max. (each can have up to 10 presets (X2#s) assigned)

## Command/Response Table for SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>View ties, gain, volume, mutes, presets, and DIP switch status (continued)</b>			
View output mutes	<code>[Esc]VM←</code>	<code>[x27]<sup>1</sup>[x27]<sup>2</sup> ... [x27]<sup>n</sup>Mut←</code>	Each <code>[x27]</code> response is the mute status of an output: left = output 1, right = output <i>n</i> . <i>n</i> = the highest output number for this model.
<i>Example (MTPX Plus 3216):</i>	<code>[Esc]VM←</code>	<code>Mut0220200002202000←</code>	Output 1 is unmuted, output 2 video is muted, output 3 video and audio are muted, and output 4 audio is muted. Outputs 5 through 8 are not present on this switcher.
<p><b>NOTE:</b> The "Mut" portion of the response appears only when the switcher is in Verbose mode 1 or 3 (see the <b>Set verbose mode SIS</b> command on page 95).</p>			
View video global preset configuration	<code>[Esc][x23]*[x2]*1VC←</code>	<code>[x1]<sup>n</sup>•[x1]<sup>n+1</sup>•[x1]<sup>n+1</sup>•[x1]<sup>n+2</sup>•...•[x1]<sup>n+15</sup>•Vid←</code>	Show the video configuration for preset <code>[x23]</code> . Show the input tied to 16 sequential outputs, starting from output <code>[x2]</code> .
<i>Command description:</i>	preset #*starting output # (StO#)*1(=video)VC		
<i>Response description:</i>	input # (I#) tied to StO#•I# tied to StO#+1•I# tied to StO#+2•...•I# tied to StO#+15•Vid←		
<p><b>NOTES:</b></p> <ul style="list-style-type: none"> <li>The starting output number (<code>[x2]</code>) should always be "1" for matrix sizes of 16 outputs or smaller.</li> <li><code>[Esc][x23]*[x2]*1VC←</code> where <code>[x23] = 0</code> returns the current video configuration.</li> </ul>			
<i>Example (MTPX Plus 168):</i>	<code>[Esc]3*1*1VC←</code>	<pre> input 8 tied to output 4 input 12 tied to output 3 no tied input outputs do not exist Response = tied input: 08•08•12•08•08•11•00•00•...•Vid← Output: 1 2 3 4 5 6 7 8 09 10 11 12 13 14 15 16                     </pre>	<p>Each position shown in the response is an output: left = starting output (1), right = starting output +15 (16). (Outputs 9 through 16 are not present on the MTPX Plus 168.) The number in each position is the input tied to that output.</p> <p>In this example, preset 3, video input 8 is tied to outputs 1, 2, 4, and 5; input 12 is tied to output 3; and input 11 is tied to output 6. No inputs are tied to outputs 7 and 8.</p>

<b>NOTE:</b>	<code>[x1]</code> = Input number	00 – (maximum number of inputs for your model)
	<code>[x2]</code> = Output number	01 – (maximum number of outputs for your model)
	<code>[x23]</code> = Global or room preset #	01 - 32 (global) or 01-10 (room)
	<code>[x27]</code> = Audio or RS-232 mute:	0 = no mutes                      2 = audio or RS-232 mute

## Command/Response Table for SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>View ties, gain, volume, mutes, presets, and DIP switch status (continued)</b>			
View audio global preset configuration	$\text{Esc} \times 23 * \times 2 * 2 \text{VC} \leftarrow$	$\times 1^n \bullet \times 1^{n+1} \bullet \times 1^{n+2} \bullet \dots \bullet \times 1^{n+15} \bullet \text{Aud} \leftarrow$	Show the audio configuration for preset $\times 23$ . Show the input tied to 16 sequential outputs, starting from output $\times 2$ .
<i>Command description:</i>	preset #*starting output # (StO#)*2(=audio)VC		
<i>Response description:</i>	input # (I#) tied to StO#•I# tied to StO#+1•I# tied to StO#+2•...•I# tied to StO#+15•Aud $\leftarrow$		
<b>NOTES:</b> <ul style="list-style-type: none"> <li>The starting output number (<math>\times 2</math>) should always be "1" for matrix sizes of 16 outputs or smaller.</li> <li><math>\text{Esc} \times 23 * \times 2 * 2 \text{VC} \leftarrow</math> where <math>\times 23 = 0</math> returns the current audio configuration.</li> </ul>			
<i>Example: (MTPX Plus 1632)</i>	$\text{Esc} 15 * 17 * 2 \text{VC} \leftarrow$	input 1 tied to output 19      no tied input Response = tied input: $01 \bullet 01 \bullet 01 \bullet 01 \bullet 02 \bullet 12 \bullet 12 \bullet 00 \bullet 00 \bullet 00 \bullet 00 \bullet 00 \bullet 01 \bullet 08 \bullet 15 \bullet 16 \bullet \text{Aud} \leftarrow$ Output: 17   18   19   20   21   22   23   24   25   26   27   28   29   30   31   32	Each position shown in the response is an output: left = starting output (17), right = starting output +15 (32). The number in each position is the input tied to that output. In this example, preset 15, audio input 1 is tied to outputs 17, 18, 19, 20, and 29; input 2 is tied to output 21; input 12 is tied to outputs 22 and 23; input 8 is tied to output 30; input 15 is tied to output 31; and input 16 is tied to output 32. No input is tied to output 24, 25, 26, 27, and 28.
View video room preset configuration	$\text{Esc} \times 25 * \times 23 * 1 * 1 \text{VC} \leftarrow$	$\times 1^n \bullet \times 1^{n+1} \bullet \times 1^{n+2} \bullet \dots \bullet \times 1^{n+15} \bullet \text{Vid} \leftarrow$	Show the video configuration for room $\times 25$ , preset $\times 23$ . Show the input tied to up to 16 outputs assigned to room $\times 25$ .
<i>Command description:</i>	room #*room preset #*starting output # (StO#)*1(=video)VC		
<i>Response description:</i>	input # (I#) tied to StO#•I# tied to StO#+1•I# tied to StO#+2•...•I# tied to StO#+15•Vid $\leftarrow$		
<b>NOTE:</b> The starting output number ( $\times 2$ ) should always be "1" for matrix sizes of 16 outputs or smaller.			
View audio room preset configuration	$\text{Esc} \times 25 * \times 23 * 1 * 2 \text{VC} \leftarrow$	$\times 1^n \bullet \times 1^{n+1} \bullet \times 1^{n+2} \bullet \dots \bullet \times 1^{n+15} \bullet \text{Aud} \leftarrow$	Show audio configuration for room $\times 25$ , preset $\times 23$ . Show the input tied to up to 16 outputs assigned to room $\times 25$ .
<i>Command description:</i>	room #*room preset #*starting output # (StO#)*2(=audio)VC		
<i>Response description:</i>	input # (I#) tied to StO#•I# tied to StO#+1•I# tied to StO#+2•...•I# tied to StO#+15•Aud $\leftarrow$		
<b>NOTE:</b> The starting output number ( $\times 2$ ) should always be "1" for matrix sizes of 16 outputs or smaller.			
View Input Select DIP switch positions and level/peaking status	$\text{Esc} \text{Stat} \leftarrow$	$\times 28^1 \times 28^2 \times 28^3 \dots \times 28^n * \times 9 \leftarrow$	Each $\times 28$ is the position for that rear panel Input Select DIP switch from 1 to $n$ . $n = 3$ for matrix sizes up to 1616, $n = 6$ for matrix sizes of 1632 and larger. $\times 9$ indicates whether the input level/peaking is within the pre-determined threshold for the input tied to output 1 <b>only</b> .
<b>NOTE:</b> This command is invalid for the MTPX Plus 128 <b>only</b> .			

<b>NOTE:</b> $\times 1$ = Input number	00 – (maximum number of inputs for your model)
$\times 2$ = Output number	01 – (maximum number of outputs for your model)
$\times 9$ = Threshold	0 = outside of threshold      1 = within threshold
$\times 23$ = Global or room preset #	01 - 32 (global) or 01-10 (room)
$\times 25$ = Room # (for room presets)	10 max. (each can have up to 10 presets (X2#s) assigned)
$\times 28$ = Local input select DIP switch status	0 = RJ-45 position      1 = local input position

## Command/Response Table for SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>View ties, gain, volume, mutes, presets, and DIP switch status (continued)</b>			
<p><b>NOTE:</b> The response to the View File Directory command differs, depending on whether the command is sent via an RS-232/RS-422 or Telnet connection or sent via a Web browser connection.</p>			
View file directory RS-232/RS-422 port and Telnet	<code>[Esc]DF←</code>	<pre>filename1,date/time,length] filename2,date/time,length] filename3,date/time,length] . . . filenamen,date/time,length] # of Bytes·Left]←</pre>	List user-supplied files.
View file directory Web browser	<code>[Esc]DF←</code>	<pre>Var file = new array (); File [1] = 'filename1,date1,filesize1'; File [2] = 'filename2,date2,filesize2'; File [3] = 'filename3,date3,filesize3'; . . File [n] = 'filenamen,daten,filesizeen'; File [n+1] = # of Bytes·Left</pre>	List user-supplied files.
Erase user-supplied Web pages/files	<code>[Esc]filenameEF←</code>	<code>Delfilename←</code>	
<b>Information requests</b>			
Information request	I	<code>√[x29]x[x30]•A[x29]x[x30]←</code>	V (video) matrix size A (audio) matrix size
Request part number	N	<code>[x31]←</code>	See " <b>Part Numbers and Accessories</b> " in the "Reference Information" section.
<p><b>NOTE:</b> There are up to three separate sets of Extron firmware on which the switcher can report: the controller firmware, which is the overall control firmware; the Ethernet protocol firmware, which handles the Ethernet interface; and the latest optional Extron firmware update, which is available at <a href="http://www.extron.com">www.extron.com</a>.</p>			
Query controller firmware version <i>Example:</i>	Q Q	<code>[x32]←</code> 1.23←	The factory-installed controller firmware version is 1.23 (sample value only).
Query controller firmware version (verbose)	∅Q	<code>[x32]-[x33]-[x33]←</code>	Provide a detailed status of the MTPX Plus controller firmware and any firmware upgrade. The firmware that is running is marked by an asterisk (*). A caret (^) indicates that the firmware has a bad checksum or an invalid load. ?? indicates that firmware is not loaded.
<i>Response description:</i> Ethernet protocol firmware version-controller firmware version-updated firmware version]			
<i>Example:</i>	∅q		
	1.23-1.∅∅(1.∅6-16x16 Series	Description	* indicates the version running
Ethernet protocol firmware		MTPX firmware version	Upload date and time
			Updated firmware version

**NOTE:** [x29] = Number of inputs 8, 12, 16, or 32  
[x30] = Number of outputs 8, 16, or 32  
[x31] = Part number 60-*nnn-nn*  
[x32] = Firmware version number to second decimal place (*x.xx*)  
[x33] = Verbose firmware version-description-upload date/time

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>Information requests (continued)</b>			
Request system status	S	See below	
<b>MTPX Plus 128:</b>		$\boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X35} \cdot \boxed{X36} \cdot \boxed{X36} \cdot \boxed{X36} \leftarrow$	
<b>Other matrix sizes 1616 and smaller:</b>		$\boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X35} \cdot \boxed{X36} \cdot \boxed{X36} \leftarrow$	
<b>Matrix sizes 1632 and larger:</b>		$\boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X34} \cdot \boxed{X35} \cdot \boxed{X36} \cdot \boxed{X36} \cdot \boxed{X36} \leftarrow$	
<i>Response description (MTPX Plus 128):</i>		$+3.3V \cdot +5V \cdot -5V \cdot +12V \cdot -12V \cdot \text{temperature (degrees Fahrenheit)} \cdot \text{Fan 1 speed} \cdot \text{Fan 2} \cdot \text{Fan 3} \leftarrow$	
<i>Response description (other matrix sizes 1616 and smaller):</i>		$+3.3V \cdot +5V \cdot -5V \cdot +12V \cdot -12V \cdot \text{temperature (degrees Fahrenheit)} \cdot \text{Fan 1 speed} \cdot \text{Fan 2} \leftarrow$	
<i>Response description (matrix sizes 1632 and larger):</i>		$+3.3V \cdot +5V \cdot -5V \cdot +12V \cdot -12V \cdot +2.5V \cdot -2.5V \cdot \text{temperature (degrees Fahrenheit)} \cdot \text{Fan 1 speed} \cdot \text{Fan 2} \cdot \text{Fan 3} \leftarrow$	
<b>NOTE:</b> Fans are numbered 1, 2, 3, from rear to front.			
<i>Example (MTPX Plus 128):</i>	S	$+12V \text{ power system at } 11.52V$ $+3.28 \cdot +4.98 \cdot -5.01 \cdot +11.52 \cdot -12.35 \cdot +086.80 \cdot 03590 \cdot 03668 \cdot 03668 \leftarrow$ $+3.3V \text{ power system at } 3.28V$ Fan 1 (rear) rotating at 3590 RPM	

<b>NOTE:</b>	$\boxed{X34}$ = Voltage	Positive or negative voltage and magnitude
	$\boxed{X35}$ = Temperature	Degrees Fahrenheit
	$\boxed{X36}$ = Fan speed	RPM

## Symbol definitions

**X40** = Matrix name (Up to 240 alphanumeric characters)

**NOTE:** The HTML language reserves certain characters for specific functions (see “**Special Characters**” on page 95).

**X41** = Default name

MTPX- + last 3 pairs of MAC address

**X42** = Time and date (for set)

In the format: MM/DD/YY•HH:MM:SS *where*:  
 MM = month: 01 (January) through 12 (December)  
 DD = 01 through 31  
 YY = 00 through 99  
 HH = 00 through 23  
 MM = 00 through 59  
 SS = 00 through 59

**X43** = Time and date (for read)

In the format: Day•DD•Mmm•YYYY•HH:MM:SS *where*:  
 Day of the week: Mon through Sun  
 DD = 01 through 31  
 Mmm = month: Jan through Dec  
 YYYY = 2000 through 2099  
 HH = 00 through 23  
 MM = 00 through 59  
 SS = 00 through 59

**X44** = GMT offset

-12.0 through +14.0. Hours and minutes removed from GMT

**X45** = Daylight Savings Time

0 = Daylight Savings Time off/ignore  
 1 = Daylight Savings Time on (northern hemisphere)  
 2 = Daylight Savings Time on (Europe)  
 3 = Daylight Savings Time on (Brazil)

**X46** = IP address

###.###.###.###

**X47** = Hardware (MAC) address

##-##-##-##-##-##

**X48** = Number of open connections

000 - 200

**X49** = Password

Up to 12 alphanumeric characters

**NOTE:** The HTML language reserves certain characters for specific functions (see “**Special Characters**” on page 95).

**X50** = Domain name

Standard domain name rules apply (for example: xxx.com)

**NOTE:** The HTML language reserves certain characters for specific functions (see “**Special Characters**” on page 95). The @ character is acceptable only as the lead-in to the domain name (such as @extron.com).

**X51** = E-mail account

65 - 72. 65 = e-mail recipient 1, 66 = 2, 67 = 3, ... 72 = recipient #8

**X52** = E-mail address

Typical e-mail address format (for example: nnnn@xxx.com)

**X53** = Notify when?

0 = no response                    3 = both 1 & 2  
 1 = fail/missing 4 = suspend  
 2 = fixed/restored

**X54** = Notification selections

00 = both fans, 01 (fan 1), or 02 (fan 2)

**X55** = Notify status (for read)

17-digit number. For each digit: 0 = do not notify, 1 = notify

**X56** = DHCP

0 = off, 1 = on

**X57** = Port #

00 through 99 (00 = all ports)

**X58** = Baud rate

9600, 19200, 38400, 115200

**X59** = Parity

odd, even, none, mark, space (only the first letter required)

**X60** = Data bits

7, 8

**X61** = Stop bits

1, 2

**X62** = Port type

0 = RS-232  
 1 = RS-422  
 2 = RS-485



**X63** = Verbose mode

- 0 = clear/none (default for Telnet connection)
- 1 = verbose mode (default for RS-232/RS-422 connection)
- 2 = tagged responses for queries
- 3 = verbose mode and tagged for queries

**NOTE:** If tagged responses is enabled (modes 2 and 3), all read commands return the constant string and the value as the set command does (for example, the read matrix name command **Esc**CN←, returns lpn•**X40**←←).

**X64** = Flow control

hardware, software, none (only the first letter required)

**X65** = Data pacing (in ms between bytes)

0000 (default) - 1000

**X66** = Time (in 10 ms increments) to wait for characters

10 (= 100 ms, default) - 32767

**X67** = Time (in 10 ms increments) to wait between characters

2 (= 20 ms, default) - 32767

**X68** = Port timeout interval (in 10-sec. increments)

1 (= 10 seconds) - 65000 (default is 30 = 300 seconds = 5 minutes)

## Command/Response Table for IP-specific SIS Commands

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>IP setup commands</b>			
Set matrix name	<b>Esc</b> <b>X40</b> CN←	lpn• <b>X40</b> ←←	
Read matrix name (location)	<b>Esc</b> CN←	<b>X40</b> ←←	
Reset matrix name to factory default	<b>Esc</b> •CN←	lpn• <b>X40</b> ←←	
Set time and date	<b>E</b> <b>X42</b> CT←	lpt <b>X42</b> ←←	
Read time and date	<b>Esc</b> CT←	<b>X43</b> ←←	
Set GMT offset	<b>Esc</b> <b>X44</b> CZ←	lpz <b>X44</b> ←←	In the command, the divider between hours and minutes can be either a colon or a period. In the response, the divider is a colon.
<i>Example:</i>	<b>Esc</b> 8.3CZ←	lpz+08:30←←	8.3 = 8:30
Read GMT offset	<b>Esc</b> CZ←	<b>X44</b> ←←	
Set Daylight Savings Time	<b>Esc</b> <b>X45</b> CX←	<b>X45</b> ←←	
Read Daylight Savings Time	<b>Esc</b> CX←	<b>X45</b> ←←	
Set IP address	<b>Esc</b> <b>X46</b> CI←	lpi <b>X46</b> ←←	
Read IP address	<b>Esc</b> CI←	<b>X46</b> ←←	
Read hardware address	<b>Esc</b> CH←	<b>X47</b> ←←	Reads MAC address.
Read # of open connections	<b>Esc</b> CC←	<b>X48</b> ←←	
Set subnet mask	<b>Esc</b> <b>X46</b> CS←	lps <b>X46</b> ←←	
Read subnet mask	<b>Esc</b> CS←	<b>X46</b> ←←	
Set gateway IP address	<b>Esc</b> <b>X46</b> CG←	lpg <b>X46</b> ←←	
Read gateway IP address	<b>Esc</b> CG←	<b>X46</b> ←←	
Set administrator password	<b>Esc</b> <b>X49</b> CA←	lpa• <b>X49</b> ←←	
Read administrator password	<b>Esc</b> CA←	<b>X49</b> ←←	
Reset (clear) administrator password	<b>Esc</b> •CA←	lpa•←←	
Set user password	<b>Esc</b> <b>X49</b> CU←	lpu• <b>X49</b> ←←	
Read user password	<b>Esc</b> CU←	<b>X49</b> ←←	
Reset (clear) user password	<b>Esc</b> •CU←	lpu•←←	
Set mail server, domainname	<b>Esc</b> <b>X46</b> , <b>X50</b> , <b>X49</b> CM←	lpm <b>X46</b> , <b>X50</b> , <b>X49</b> ←←	
Read mail server, domainname	<b>Esc</b> CM←	<b>X46</b> , <b>X50</b> , <b>X49</b> ←←	
Set e-mail recipient	<b>Esc</b> <b>X51</b> , <b>X52</b> CR←	lpr <b>X51</b> , <b>X52</b> , ←←	This command sets the recipient. To receive e-mail notifications, you must then set the events that the switcher reports, using one or more separate Set e-mail events (EM) commands (see next page).
<i>Example:</i>	<b>Esc</b> 72,Jsmith@folklore.netCR←		
		lpr72,Jsmith@folklore.net, ←←	
Read e-mail recipient	<b>Esc</b> <b>X51</b> CR←	<b>X52</b> , ←←	

## Command/Response Table for IP Setup SIS Commands (continued)

Command Function	SIS Command (Host to Unit)	Response (Unit to Host)	Additional description
<b>IP setup commands (continued)</b>			
Set e-mail events for recipient	<code>[Esc]F, [X51], [X54], [X53]EM←</code>	<code>IpeF, [X51], [X54], [X53]←</code>	You must first have set an e-mail recipient for the e-mail account number <code>[X51]</code> , using the separate Set e-mail recipient (CR) command.
<i>Example:</i>	<code>[Esc]F, 72, 0, 2EM←</code>	<code>IpeF*72*0*3←</code>	E-mail account #72, JSmith, will receive fail/missing and fixed/restored messages for both fans.
Read e-mail notifications for one account (recipient)	<code>[Esc][X51], [X54], [X53]EM←</code>	<code>[X54], [X54], [X54], ... , [X54]←</code>	
Set DHCP on or off	<code>[Esc][X56]DH←</code>	<code>Idh[X56]←</code>	
Read DHCP on/off status	<code>[Esc]DH←</code>	<code>[X56]←</code>	
Set serial port parameters	<code>[Esc][X57]*[X58], [X59], [X60], [X61]CP←</code>	<code>Cpn[X57]•Ccp[X58], [X59], [X60], [X61]←</code>	
Read serial port parameters	<code>[Esc][X57]CP←</code>	<code>[X58], [X59], [X60], [X61]←</code>	
Configure flow control	<code>[Esc][X57]*[X64], [X65]CF←</code>	<code>Cpn[X57]•Cfl[X64], [X65]←</code>	
Read flow control	<code>[Esc]CF←</code>	<code>[X64], [X65]←</code>	
Configure receive timeout	<code>[Esc][X57]*[X66], [X67]CE←</code>	<code>Cpn[X57]•Cce[X66], [X67]←</code>	
Read receive timeout	<code>[Esc]CE←</code>	<code>[X66], [X67]←</code>	
Set mode	<code>[Esc][X57]*[X62]CY←</code>	<code>Cpn[X57]•Cty[X62]←</code>	
Read mode	<code>[Esc][X57]CY←</code>	<code>[X62]←</code>	
Set verbose mode	<code>[Esc][X63]CV←</code>	<code>Vrb[X63]←</code>	
Read verbose mode	<code>[Esc]CV←</code>	<code>[X63]←</code>	
Configure current port timeout	<code>[Esc]0*[X68]TC←</code>	<code>Pti0*[X68]←</code>	
Read current port timeout	<code>[Esc]0TC←</code>	<code>[X68]←</code>	
Configure global IP port timeout	<code>[Esc]1*[X68]TC←</code>	<code>Pti1*[X68]←</code>	
Read global IP port timeout	<code>[Esc]1TC←</code>	<code>[X68]←</code>	
Clear room preset ties	<code>[Esc]+[X25]*[X23]P0*!←</code>	<code>Rmm[X25]•Spr[X23]←</code>	Clear all ties in room <code>[X23]</code> preset <code>[X23]</code> .

## Special Characters

The HTML language reserves certain characters for specific functions. The switcher does not accept these characters as part of preset names, name of the switcher, passwords, or locally created file names.

The switcher rejects the following characters:

{space (spaces **are** ok for names)} + ~ , @ = ' [ ] { } < > ' " semicolon (;) colon (:)| \ and ?.

# Matrix Software

This section introduces the software that is included with the MTPX Plus Matrix Switchers and details how to use it to optimize the video signal. This section includes:

- **Matrix Switchers Control Program**
- **Optimizing the Video**
- **Button-Label Generator Program**

## Matrix Switchers Control Program

The Extron Matrix Switchers Control Program provides an easy way to set up ties and sets of ties. The program is compatible with Windows 2000, Windows XP, and later. Updates to this program can be downloaded from the Extron Web site ([www.extron.com](http://www.extron.com)).

The program communicates with the switcher via the following ports:

- **Rear panel LAN port** — An RJ-45 connection (see “**Ethernet Connection**” in the “Installation” section).
- **Rear panel Remote port (MTPX Plus 128)** — A 3-pin captive screw connector for serial RS-232 control (see “**Remote Connection**” in the “Installation” section).
- **Rear panel Remote port (all other models)** — A 9-pin D connector for serial RS-232 or RS-422 control (see “**Remote Connection**” in the “Installation” section).

**NOTE:** The Remote ports can operate at 9600, 19200, 38400, or 115200 baud rates. Models other than the MTPX Plus 128 can support either the RS-232 or RS-422 serial communication protocol (see “**Selecting the Rear Panel Remote Port Protocol and Baud Rate**” in the “Operation” section to configure the Remote port from the front panel).

- **Front Panel Configuration port (MTPX Plus 128)** — A mini USB B port (see “**Front Panel Configuration Port**” in the “Installation” section).
- **Front Panel Configuration port (all other models)** — A 2.5 mm mini stereo jack for serial RS-232 control (see “**Front Panel Configuration Port**” in the “Installation” section).

**NOTE:** The mini jack Configuration port can operate at 9600, 19200, 38400, or 115200 baud rates (see the **Serial port parameters** SIS commands on page 95 to set the baud rate of this port using an SIS command).

## Installing the Software

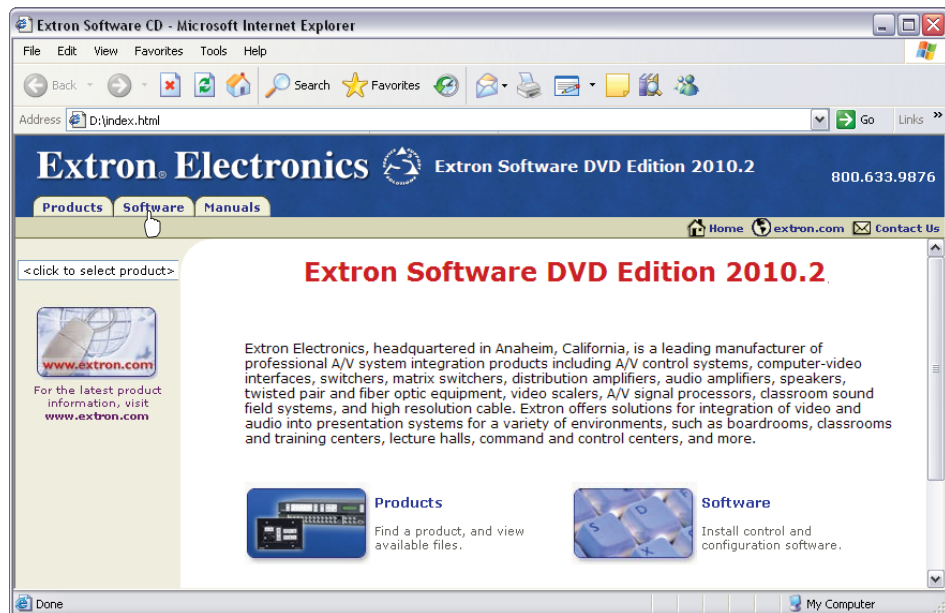
**NOTE:** For an MTPX Plus 128, you must use version 8.0 or newer of the Matrix Switchers Control Program.

The program is contained on the Extron Software Products DVD. Install the software as follows:

**NOTE:** For full functionality, install both of the following programs:

- The Matrix Switchers Control Program
- The Firmware Loader

1. Insert the DVD into the drive. The Extron software DVD window should appear automatically (see figure 47).



**Figure 47. Software DVD Window**

**NOTE:** If the window does not self-open, run Launch.exe from the DVD.

2. Click the **Software** tab (see figure 47).
3. Scroll to the desired program and click **Install** (see figure 48).

• <b>Matrix Switchers</b>	79-520-01	7.1	Sep 7, 2006	4.6 MB	<b>Install</b>
RS-232 Windows Control Program.					
<a href="#">Release Notes</a>					

**Figure 48. Software Installation**

4. Follow the on-screen instructions. By default, the installation of the Matrix Switchers Control Program creates a C:\Program Files\Extron\Matrix\_Switchers directory, and it places the following four icons into a group folder named "Extron ElectronicsMatrix Switchers":
  - MATRIX Switcher + Control Program
  - MATRIX Switcher + Help
  - Check for Matrix Updates
  - Uninstall MATRIX Switcher

## Software Operation via Ethernet

When an MTPX Plus switcher is connected to an Ethernet WAN or LAN, up to 200 users can be connected to operate it, locally or remotely, using the Matrix Switchers Control Program (see “**Ethernet Connection**” in the “Installation” section for installation details).

Connection to the switcher via the Ethernet is password protected. There are two levels of password protection:

- Administrators have full access to all MTPX Plus switching capabilities and editing functions.
- Users can select inputs and outputs, set and recall presets, and view all settings with the exception of passwords.

If the same password or no password is required for logging on, all personnel log on with administrator privileges. Fields and functions that exceed user privileges are not available in the Matrix Switchers Control Program when the operator is logged on as a user.

### Ethernet protocol settings

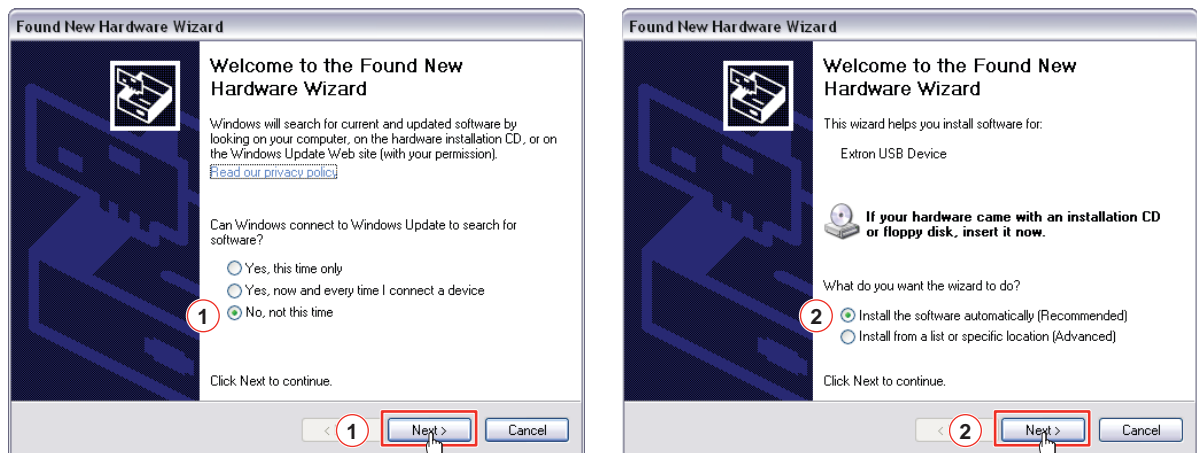
The IP Settings/Options screen (see **figure 54** on page 103) provides a location for viewing and, if connected via a serial port or USB port or if logged on via the LAN port as an administrator, editing settings unique to the Ethernet interface (see “**IP Settings/Options window**”, later in this chapter, for more details).

## Using the Matrix Switcher Control Software

Many items found in the Matrix Switchers Control Program are also accessible via front panel controls (see “**Front Panel Operations**” in the “Operation” section) and under SIS control (see the “**Programming Guide**” section). The Matrix Switcher+ Help icon opens the Help file, which provides information on settings and on how to use the control program itself.

**NOTE:** For the MTPX Plus 128, the first time you connect to the Configuration (USB) port, the Found New Hardware Wizard appears (see **figure 49**) (see “**Activating a USB port for the first time,**” below).

For other connections, proceed to “**Starting and using the program**” on the next page.



**Figure 49.** Found New Hardware Wizard

### Activating a USB port for the first time

For the MTPX Plus 128, the first time you connect to the Configuration (USB) port, the Found New Hardware Wizard appears (see **figure 49**). Activate the connected USB port for your device as follows:

**NOTE:** If you have not installed the latest Matrix Switchers Control Program (version 8.0 or newer), click Cancel and install the program. Reconnect the switcher to the Configuration port.

1. Select the **No, not this time** radio button and click **Next**.
2. Select the **Install the software automatically** radio button and click **Next**. Follow the on-screen instructions. The wizard assigns the driver necessary to access the switcher to the connected Configuration (USB) port (this may take a few minutes).
3. Click **Finish** to exit the wizard.
4. Proceed to “**Starting and using the program**” on the next page or return to the “**Programming Guide**” section.

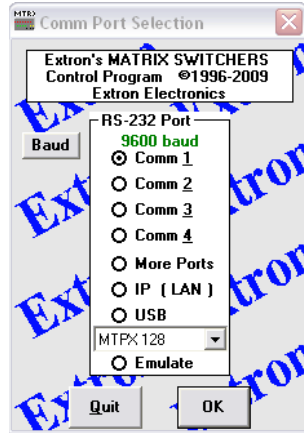
**NOTE:** You may need to repeat these steps if you subsequently connect the switcher to a different USB port on the same computer..

## Starting and using the program

1. To run the Matrix Switchers Control Program, click **Start > Programs > Extron Electronics > Matrix Switchers > MATRIX Switcher + Control Pgm.**



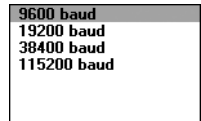
The Comm Port Selection window (figure 50) appears.



**Figure 50.** Comm Port Selection Window

2. Choose either the Comm port that is connected to the rear panel Remote port or front panel Config (RS-232) port, **IP [LAN]**, **USB**, or **Emulate**.

- **If you selected a comm port**, check the baud rate displayed in the comm port selection window. If you need to change the baud rate, click on the **Baud** button and double-click on the desired baud rate.

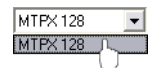


Available rates are 9600, 19200, 38400, and 115200. The default is 9600.

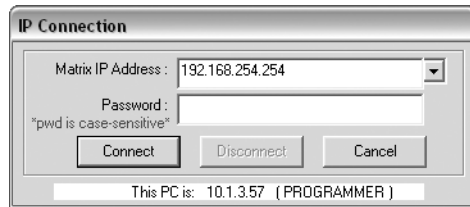
**NOTE:** You may need to repeat these steps if you subsequently connect the switcher to a different USB port on the same computer.

Click OK and proceed to step 4.

- **If you selected USB**, select the MTPX 128 in the drop-down window and click OK. Proceed to step 4.
- **If you selected IP [LAN]**, click **OK** and proceed to step 3.
- **If you selected Emulate**, click **OK** and see “Using Emulation mode” on page 119.



3. If you selected IP [LAN] in step 2, the IP Connection window appears (see figure 51).



**Figure 51. Address and Password Entry**

- a. Examine the Matrix IP Address field in the IP Connection window. The field displays the last Matrix IP address entered.

**If the IP address is correct:** Proceed to step 3b.

**If the address is not correct:** Either click in the Matrix IP Address field and enter the IP address or click on the scroll down button (▼) and select from among the recently used addresses. Proceed to step 3b.

**NOTE:** If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.

- b. If the switcher is password protected, click in the Password field and enter the appropriate administrator or user password.

- c. Click **Connect**.

If you logged on using the administrator password, the Windows program connects you to the MTPX Plus switcher with all of the administrator rights and privileges.

If you logged on using the user password, the Windows program connects you to the MTPX Plus switcher with only user capabilities.

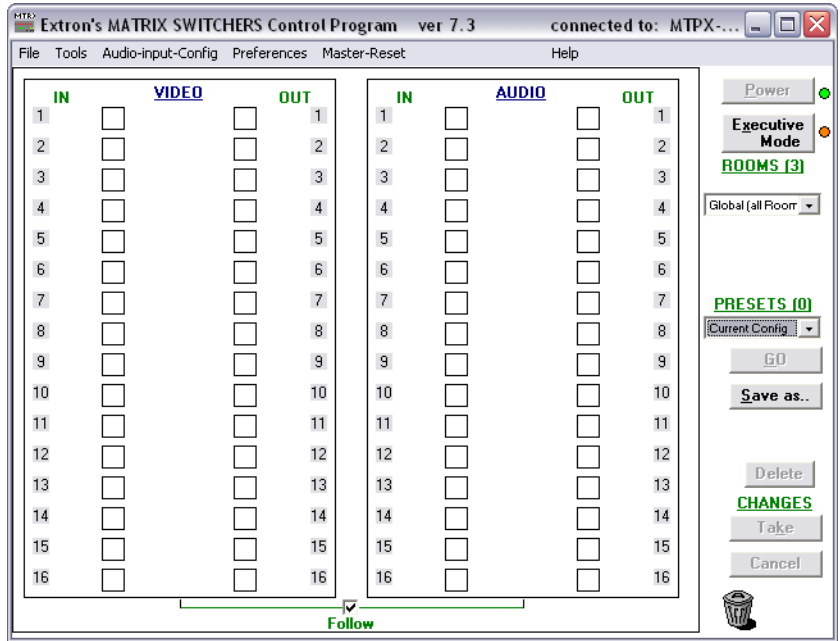
If an incorrect password was entered, the program beeps and returns to the password entry display.

4. The Extron Matrix Switchers Control Program window appears (see **figure 52** and **figure 53** on the next page). The window displays the current configuration of the attached matrix. Operate the switcher as desired.

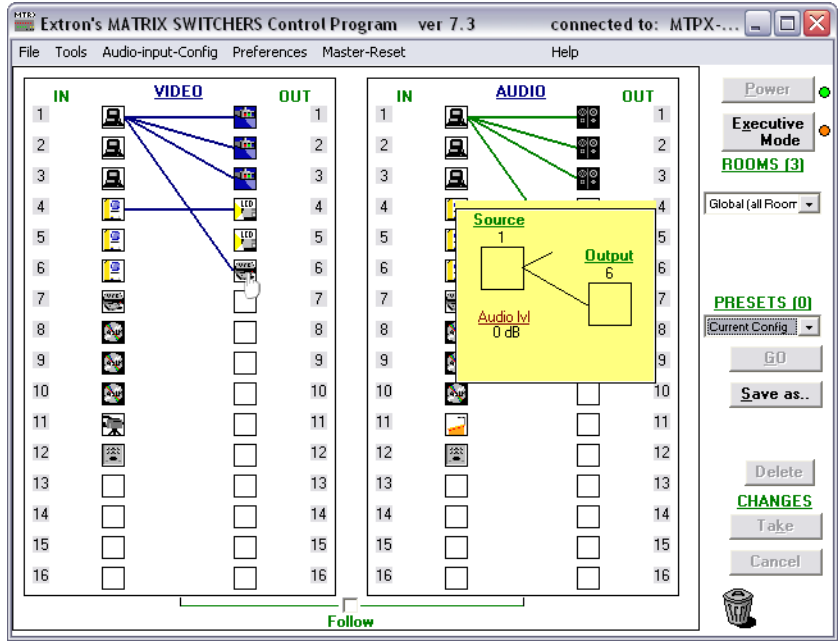
- To make the control program easier to use, assign a device icon to each input and output. Click on a box that represents an input or output, and drag the desired icon onto the box from the icon palette that appears.
- To set up audio in Follow mode (audio and video have the same tie configuration), select the **Follow** box at the bottom of the window (see **figure 52**). To set up audio in breakaway mode (audio and video have different tie configurations), deselect the **Follow** box (see **figure 53**).
- To create a tie, drag an input box to one or more output boxes. To remove a tie, drag the output box to its tied input box or to the trash can.
- For quick display of information on a specific input or output device, position the cursor over that device in the control program window. The program opens a window that details the connections to that device, the audio level, and the frequency of the video signal input from or output to that device (see the inset box in **figure 53**).

**TIP:** You can print a map of the current configuration by clicking **File > Print Tie Map**.





**Figure 52.** Extron Matrix Switchers Control Program Window (no Icons or Ties)



**Figure 53.** Sample Program Window (Icons Assigned and Ties Created)

## IP Settings/Options window

The IP Settings/Options window (click **Tools** > **IP options**, see **figure 54**) provides a location for viewing and, if connected via the either serial port or if you are logged on via the LAN port as an administrator, editing settings unique to the Ethernet interface. See the “**Ethernet Link**” section on page 146 for basic information about IP addresses. User log-ins cannot edit any of the fields on this screen.

**NOTE:** Editing variables on the IP Settings/Options screen while connected via the LAN port can immediately disconnect the user from the switcher. Extron recommends editing the settings on this screen using a serial port and protecting the Ethernet access to this screen by assigning an administrator password to qualified and knowledgeable personnel only.

The screenshot shows the 'IP Settings / Options' window with the following fields and settings:

- Matrix IP Address: 192.168.254.254
- Extron Name/Descriptor: MTPX-02-60-C8
- Gateway IP Address: 192.168.0.0
- Subnet Mask: 255.255.0.0
- Hardware Address: 00-05-A6-02-60-C8
- Use DHCP (Obtain an IP address automatically)
- Date: Tue, 22 Jan 2008
- Time (local): 07:28:00
- Sync time to PC
- GMT: -08:00
- Use Daylight Saving
- Administrator Password: admin
- User Password: user
- Mail Server IP Address: 192.168.2.25
- Domain Name: folklore.net

	E-mail Addressee	None	Fail	Fixed	Both	Fans
1	Jsmith@folklore.net	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="checkbox"/>
2	Pocahontas@folklore.net	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>
3		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
4	Mstandish@folklore.net	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>
5		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
6		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
7		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
8		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>

This PC is: 10.1.4.48 (PROGRAMMER) [Cancel] [Take]

**Figure 54.** Control Program IP Setting/Options Window

**NOTE:** When the control program is connected to the switcher via a serial port, the Administrator and User Password fields are not masked. If a password has been inadvertently changed to an unknown value, you can look up and, if desired, change a password in this window without knowing the current password.

## Address and Name fields

The **Matrix IP Address** field contains the IP address of the connected matrix switcher. This value is encoded in the flash memory in the switcher.

The **Gateway IP Address** field identifies the address of the gateway to the controlling PC to be used if the matrix switcher and the mail server are not on the same subnet.

The **Subnet Mask** field is used to determine whether the matrix switcher is on the same subnet as the controlling PC when you are subnetting. For more information, see “**Subnetting — A Primer**” in the “Ethernet Link” section on page 151.

The **Mail Server IP Address** field displays the IP address of the mail server that handles the e-mail for the facility in which the MTPX Plus switcher is installed.

Valid addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called octets, separated by dots (periods). Each octet can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

The default addresses are as follows, but if these conflict with other equipment at your installation, you can change the addresses to any valid value:

- **IP address** 192.168.254.254
- **Gateway address** 0.0.0.0
- **Subnet mask** 255.255.0.0

**NOTES:**

- The address fields are unavailable when DHCP is selected.
- Editing the addresses while connected via the Ethernet port can immediately disconnect the user from the MTPX. Extron recommends editing this field using one of the RS-232 ports and protecting the Ethernet access by assigning an administrator password to qualified and knowledgeable personnel only.

The **Extron Name/Descriptor** field contains the name of the matrix switcher. This descriptor can be changed to any valid name, up to 12 alphanumeric characters.

The **Mail Server Domain Name** field displays the domain name that the MTPX Plus switcher uses to log on to the e-mail server. Standard domain conventions (such as xxx.com) apply.

**NOTE:** The HTML language reserves certain characters for specific functions (see “**Special Characters**” in the “Programming Guide” section). In the **Mail Server Domain Name** field, the @ character is only acceptable as the lead-in to the domain name (such as @folklore.net).

Edit any of these fields as follows:

1. Click in the desired field. The graphic cursor becomes a text cursor.
2. Edit the address or name as desired.
3. Press the <Tab> key on the keyboard or click in another field to exit the field.
4. Click the **Take** button to make the address change take affect.

## Hardware Address field

The hardware address is hardcoded in the MTPX Plus switcher and cannot be changed.

## Use DHCP check box

The Use DHCP check box directs the MTPX Plus switcher to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). Contact the local system administrator.

## Date, Time (local), and GMT (offset) fields

The **Date** field displays the current date in the Greenwich Mean Time zone.

The **Time (local)** field displays the current time in the local time zone.

The **GMT** field displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.

**NOTE:** Rather than the following procedure, you can click the **Sync Time to PC** button to set the switcher to the internal time of your computer.

If desired, adjust any of these values as follows:

1. Click in the desired field. The field changes to an editable field appropriate to the value being change and the graphic cursor becomes a text cursor.

- The **Date** field becomes a set date field, with the date in the format (M)M/(D)D/YYYY. Leading zeroes are not shown.

Date :

- The **Time (local)** field becomes a set time field, with the time in the format HH:MM:SS (00:00:00 to 23:59:59).

Time (local) :

- The GMT field becomes a set offset field, with the offset in the format ±HH:MM (-12:00 to +14:00).

GMT

2. Edit the field as desired to set the proper proper value. For time, remember to use 24-hour time. Leading zeroes are optional.
3. Press the <Tab> key on the keyboard or click in another field to exit the set date field.
4. Click the **Take** button to make the date change take affect.

## Sync Time to PC button

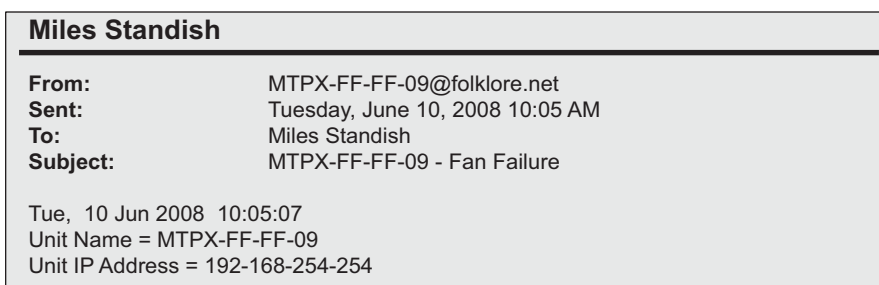
Clicking the **Sync Time to PC** button causes the computer you are operating to send its internal time to the switcher in a set time command.

## Use Daylight Savings check box

Click in the **Use Daylight Savings** check box. When Daylight Saving Time is turned on, the switcher automatically updates its internal clock between Standard Time and Daylight Saving Time in the spring and fall on the date that the time change occurs in the country or region selected. When Daylight Saving Time is turned off, the switcher does not adjust its time reference.

## E-mail Addressee fields

The eight E-mail Addressee fields permit the administrator to identify the e-mail addresses of the personnel to whom the MTPX Plus switcher e-mails notification of its failure and repair status. Figure 55 shows a typical e-mail from the switcher.



**Figure 55. Typical MTPX Plus E-mail**

The radio buttons and check boxes associated with each address field permit the administrator to specify specific e-mail requirements for each recipient.

Edit these fields and controls as follows:

1. Click in the desired E-mail Addressee field. The graphic cursor becomes a text cursor.
2. Edit the e-mail address as desired. Standard e-mail address conventions (for example: *nnnnn@xxx.com*) apply.
3. Press the <Tab> key on the keyboard or click in another field to exit the e-mail addressee field.
4. In the square **Fans** check boxes associated with each addressee, select or deselect the fans for status to be e-mailed to the addressee.
5. In the round radio buttons associated with each addressee, select whether the addressee is to be e-mailed of failures, fixes, both, or not be notified. The **None** radio button is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as on travel or vacation.
6. If desired, click the **Send test E-mail** button to test the e-mail function.
7. Click the **Take** button to make the e-mail address changes take affect.

## Updating the Firmware

The firmware upgrade utility provides a way to replace the firmware that is coded on the control board of the switcher without taking the switcher out of service.

**NOTE:** Upgrading the firmware does not overwrite the current configuration, presets, or the audio settings.

Update the switcher firmware as follows:

1. Visit the Extron website, [www.extron.com](http://www.extron.com), click the **Download** tab, and then click the **Firmware** link (see figure 56).

**NOTE:** The version, release date, and size shown are sample values only.

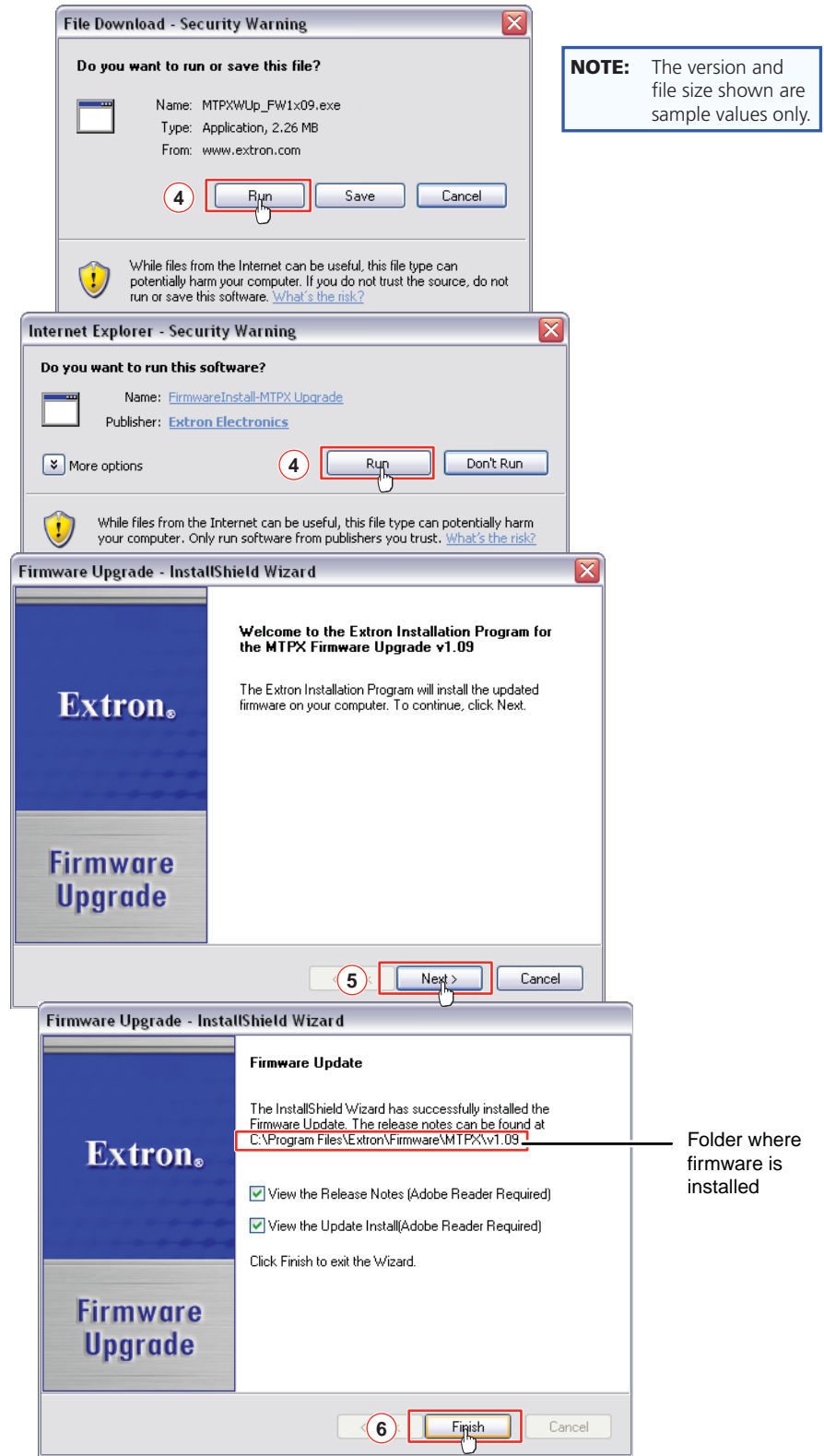
The screenshot shows the Extron website's Download Center. The top navigation bar has tabs for Products, Applications, Technologies, Company, and Download (1). The Download Center page lists various software and device drivers, with the Firmware link highlighted (1). A specific firmware file, 'MTPX Firmware', is selected, showing details like version (19-2023-50), release date (Oct 23, 2008), and size (2.3 MB). A 'Download' button (2) is visible. Below, a form for downloading the file 'MTPXWUp\_FW1x09.exe' is shown, requiring personal information (Name, Company, Title, E-mail) and a 'Download' button (3). A 'Remember Me' checkbox is also present. A note at the bottom states: 'Note: By downloading this software you agree to our [terms and conditions](#).'

**Figure 56.** Location of Firmware Upgrade Files

2. Select the appropriate firmware file (MTPX Firmware) to download and click **Download**.
3. Enter the requested personal information and then click **Download** to copy the firmware to your computer.
4. Click **Run** on the next two screens (see **figure 57** on the next page). The PC downloads the firmware update from the Extron website and starts the Extron Installation Program to extract the firmware file.
5. Click **Next**. The program extracts the firmware files and places them in a folder identified in the InstallShield Wizard window.

**NOTE:** Note the folder to which the firmware file is saved.

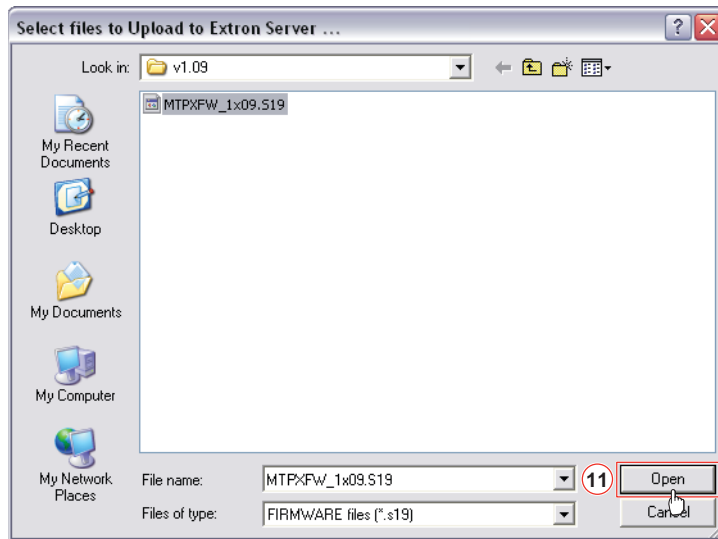
6. Click **Finish** to exit the program.



**Figure 57. Downloading Firmware Upgrade Files**

7. Connect the computer to either the **serial port**, **USB port**, or **LAN** port of the switcher (see the “Installation” section for more details).
8. Start the Matrix Switchers Control Program and connect to the matrix switcher (see “**Starting and using the software**,” on page 100).
9. Click **Tools > Update** firmware... .  
**If the switcher is connected via the LAN port**, the select file window appears (see figure 58) (see “**Ethernet-connected firmware upload**”, below).  
**If the switcher is connected via an RS-232, RS-422, or USB port**, the Extron Firmware Loader window appears (see **figure 59** on the next page) (see “**Serial-port or USB-port-connected firmware upload.**”)

### Ethernet-connected firmware upload



**Figure 58. Select File Window**

10. Navigate to the folder where you saved the firmware upgrade file. Select the file.

**CAUTION:** The firmware file must have an .s19 extension. Other file types can cause the switcher to stop functioning.

**NOTES:**

- When downloaded from the Extron website, the firmware is placed in a subfolder of C:\Program Files\Extron\Firmware.
- The original factory-installed firmware is permanently available on the matrix switcher. If the attempted firmware upload fails for any reason, the switcher reverts to the factory-installed firmware.

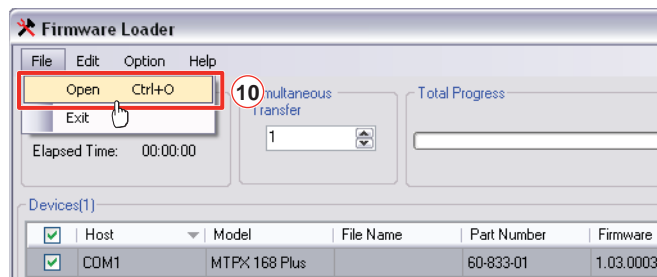
11. Click the **Open** button. The software advises you that you are about to reprogram the switcher firmware. Click **OK** to continue.

A status window, which shows the progress of the upload, appears. The firmware upload to the MTPX Plus switcher may take a few minutes.



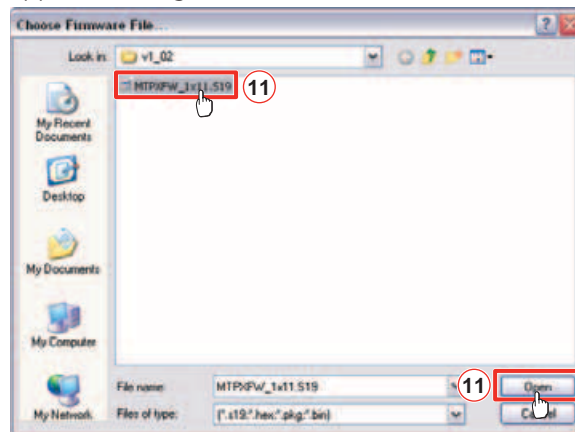


## Serial-port- or USB-port-connected firmware upload



**Figure 59. Extron Firmware Loader Window**

10. Select the MTPX Plus switcher and click **File > Open**. The Choose Firmware File screen appears (see figure 60).



**Figure 60. Choose Firmware File Window**

11. Navigate to and select the new firmware file. Click **Open**. The Choose Firmware File window closes.

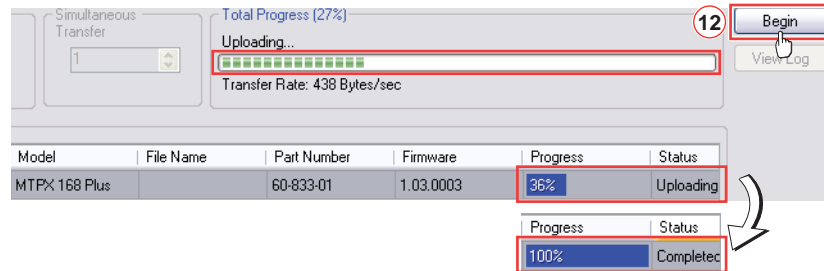
**CAUTION:** The firmware file must have an .s19 extension. Other file types can cause the switcher to stop functioning.

**NOTES:**

- When downloaded from the Extron website, the firmware is placed in a subfolder of C:\Program Files\Extron\Firmware.
- The original factory-installed firmware is permanently available on the matrix switcher. If the attempted firmware upload fails for any reason, the switcher reverts to the factory-installed firmware.

12. In the Firmware Loader window, click **Begin** (see figure 61).

The Total Progress and Progress status bars show the progress of the upload. The firmware upload to the switcher may take several minutes. Once the status bars have progressed from 0% to 100%, and Status is listed as **Complete**, the firmware loader utility resets the switcher.



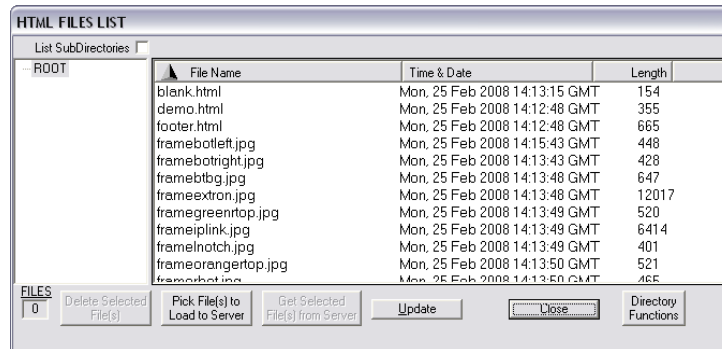
**Figure 61. Firmware Loader Screen**

13. Click **Exit** to close the Firmware Loader.

**NOTE:** The firmware loader utility increases the baud rate of the serial port to 115,200 to speed up the upload process. Occasionally, the firmware loader may be unable to return the serial port to its earlier baud rate, in which case communications with the switcher may not be possible. If you are no longer able to communicate with the switcher after the firmware upload completes, see “[Selecting the Rear Panel Remote Port Protocol and Baud Rate](#)” in the “Operation” section.

## Uploading HTML Files

You can create customized HTML pages for the switcher to display. The HTML Files List window (see figure 62) provides a way to view the contents of the file system of the switcher and to upload custom HTML pages to the switcher.



**Figure 62.** HTML Files List Window

- NOTES:**
- The files listed in figure 62 are shown for example only and may not be present on your switcher.
  - The HTML Files List window is for inserting your custom HTML pages. This is not the window to replace the firmware that controls all switcher operation. See **“Updating firmware,”** earlier in this chapter, to replace the firmware.
  - The HTML language reserves certain characters for specific functions (see **“Special Characters”** in the “Programming Guide” section).

Upload HTML pages as follows:

1. Connect the PC to the MTPX Plus switcher via a serial port, the USB port (MTPX Plus 128 only), or the LAN port.
2. Start the Matrix Switchers Control Program and connect to the MTPX Plus switcher (see **“Starting and using the software”**, steps **1** through **3**, starting on page 100).
3. Click **Tools > HTML File Manager**.
4. Click the **Pick File(s) to Load to Server** button. An open file window appears.
5. Navigate to the folder where you saved the HTML file or files. Select the file or files.

- NOTES:**
- To select multiple files, hold the Ctrl key while you select the desired files.
  - If you want one of the custom HTML files that you created to be the default start-up page, name the file “index.html.” The MTPX Plus switcher looks for that file name when you first connect to it using an Internet browser.

6. Click the **Open** button. The file or files upload to the MTPX Plus switcher may take a few minutes.
7. Click the **Update** button to confirm the upload.
8. Click the **Close** button to exit the HTML Files List window.

## Windows Buttons, Drop Boxes, and Trashcan

The buttons, drop boxes, and trash can on the right side of the program window perform the following functions:

**Power** — Unavailable for MTPX Plus Twisted Pair switchers, because the switcher power cannot be controlled via software.

**Executive Mode** — Allows you to lock out front panel operations, except for the view-only mode functions. Click the button to cycle between *Lock* mode 0 (the indicator is white), *Lock* mode 1 (the indicator displays red), and *Lock* mode 2 (orange).

**NOTE:** See “**Setting the Front Panel Locks (Executive Modes)**” in the “Operation” section for definitions of the *Lock* modes.

**Room menu** — Displays a list of up to 10 rooms. You can select a room from the list to display it in the window.

**NOTE:** A **Room** is a subset of outputs that are logically related to each other, as determined by the operator. The MTPX Plus switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.

**Presets menu** — Displays a list of up to 32 global presets and up to 100 room presets. You can select a preset from the list to display it in the window and either activate it (Go) or delete it (Delete).

**Go** — Activates the selected preset as the current configuration.

**Save as ...** — Allows the current set of ties to be saved as a preset. Enter the preset number when prompted to do so.

**Delete** — Allows the current preset to be deleted.

**Changes – Take** — Saves any changes made to the displayed configuration.

**Changes – Cancel** — Abandons any changes made to the displayed configuration.

**Trashcan** — Drag and drop from an input or output button to the trash can to unmake all ties associated with that input or output.



## Windows menus

### File menu

**Save matrix settings as ...** — Saves a complete set of up to 32 global and 100 room presets, plus the last active setting (preset #0), to a file. Saved settings include audio gain and volume settings, MTPX configuration and picture settings, assigned icons, and icon captions.

**Restore matrix settings from ...** — Loads and activates a previously saved setting file.

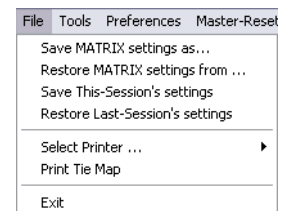
**Save this-session's settings** — Saves the current assigned icons and icon captions.

**Restore last-session's settings** — Loads the icons and icon captions that were saved during the last session. If you saved the changes from the previous session to disk the last time you exited the program, the ties from that session are also loaded.

**Select printer** — Selects the target printer.

**Print tie map** — Prints the tie set that is displayed on the screen.

**Exit** — loses the Matrix Switchers Control Program.

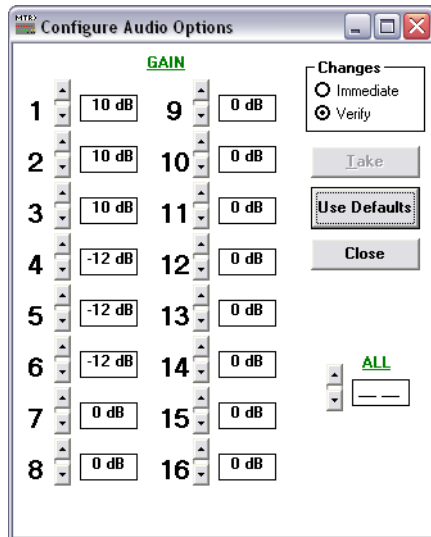


## Tools menu

**Assign Device Icons** — Displays the complete set of input and output device icons. You can drag any of these icons to the input and output boxes.

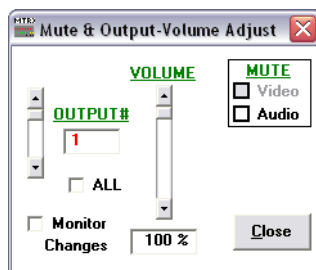
**Edit Device Palette** — Allows you to add your own device icon graphics.

**Audio-Input-Gain settings** — Displays the Configure Audio Options window (see figure 63), which shows the audio gain level settings for each input and allows you to change them.



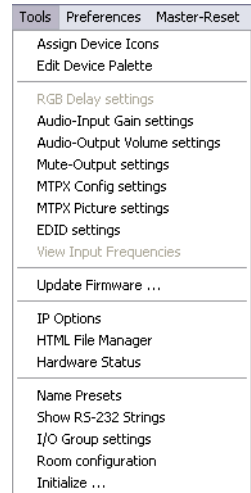
**Figure 63. Configure Audio Options Window**

**Audio-Output Volume settings** — Displays the Mute/Output-Volume Adjust window (see figure 64), which displays the audio output level setting for a single input or for all inputs and allows you to change it. The level is expressed as a percentage of the input audio volume that is applied to the output; 0% is full attenuation (audio is silent), 100% is full volume.

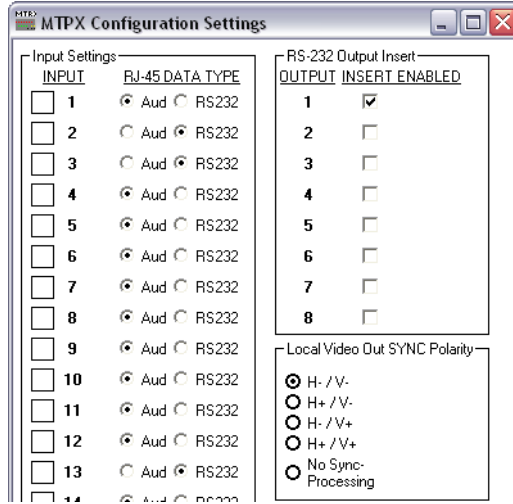


**Figure 64. Configure Audio Options Window**

**Mute-Output settings** — Displays the Mute/Output-Volume Adjust window (see figure 64), which allows you to mute and unmute the video and audio output for a single output or for all outputs.

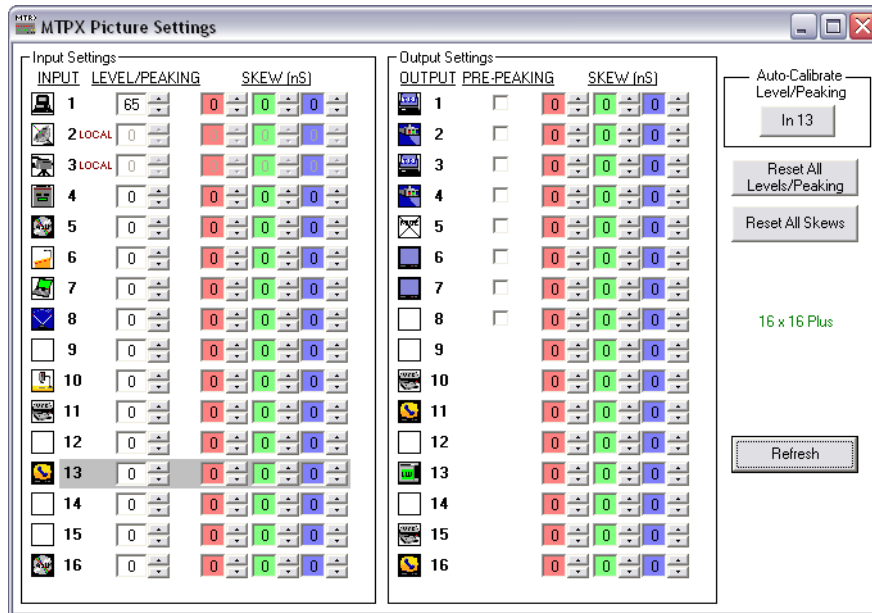


**MTPX configuration settings** — Displays the MTPX Configuration Settings window (see figure 65), which allows you to define the content of the audio/RS-232 input, enable the RS-232 output inserts, and tailor the output sync.



**Figure 65.** MTPX Configuration Settings Window

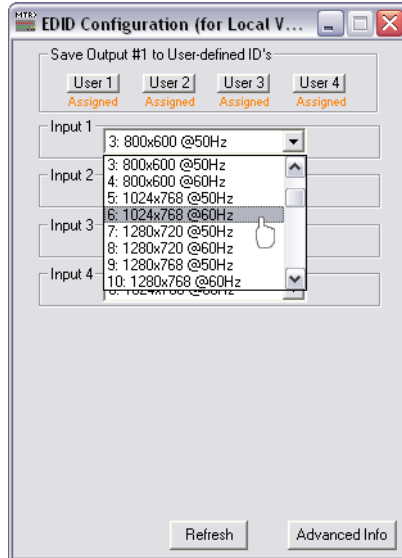
**MTPX Picture settings** — Displays the MTPX Picture Settings window (see figure 66), which allows you to set the input picture adjustments (level/peaking and skew) and the output picture adjustments (pre-peaking and skew). The Auto-Calibrate Level/Peaking button lets you use the MTP signal generator (included with most models, optional for the MTPX Plus 128) to automatically set the input level/peaking (see “[Optimizing the Video](#)” on page 121).



**Figure 66.** MTPX Picture Settings Window

**EDID settings (MTPX Plus 128 only)** — Displays the EDID Configuration window (see figure 67), which allows you to set each input to a specific EDID value and to save the output resolution to the user-configurable EDID slots.

**NOTE:** This selection is unavailable for switchers other than the MTPX Plus 128.



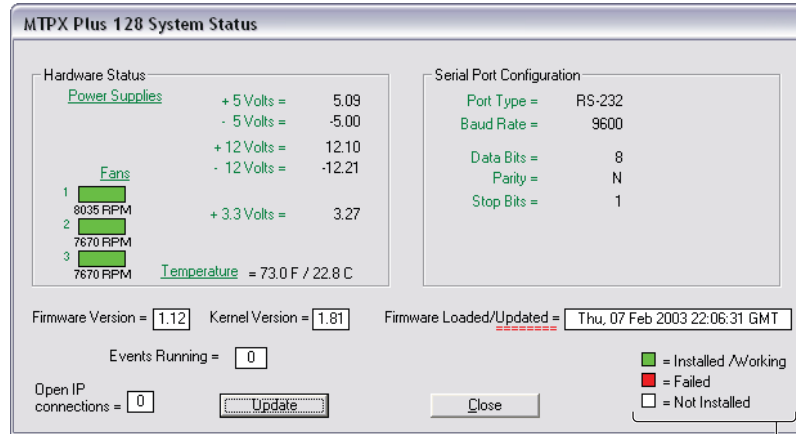
**Figure 67.** EDID Configuration window

**Update Firmware ...** — Allows you to replace the firmware that is coded on the control board of the switcher without taking the switcher out of service (see “[Updating the firmware](#)” on page 107).

**IP options** — Allows you to set IP options (see “[IP Settings/Options window](#)” on page 103).

**HTML file manager** — Displays a list of HTML files installed on the switcher and allows you to upload custom files from a PC connected to the switcher (see “[Uploading HTML files](#)” on page 112).

**Hardware status** — Provides an overall view of the status of the matrix switcher, including the power supply voltages, the temperature status, the Remote RS-232/RS-422 port configuration, and the installed and updated firmware status (see figure 68).



= Installed /Working    Fan is operating properly.  
 = Failed    Fan has failed.  
 = Not Installed    **The MTPX Plus fans will never display the “Not Installed” status.**

**Figure 68. Status window**

**Name Presets** — Allows you to name each of the 16 memory presets.

**NOTE:** Preset names are limited to 12 upper- and lower-case alphanumeric characters, space, and the \_ and / characters. The HTML language reserves certain characters for specific functions (see “**Special Characters**” in the “Programming Guide” section).

**Show RS-232 Strings** — Displays the ASCII commands that are used by the current configuration. You can refer to these for SIS programming.

**I/O Group settings** — Displays the inputs/outputs groups window, which allows you to assign inputs and outputs to any one of four groups (or no group).

**Initialize** — Initializes and clears any or all of the following: ties, presets, audio configuration, preset names, icon names, and icons.

### **Audio Input Configuration selection**

Audio-input-Config

Displays the Configure Audio Options window (see **figure 64** on page 114), which shows the audio gain level settings for each input and allows you to change them. The level is expressed as the magnitude (number of decibels) and polarity (positive, gain or negative, attenuation) of the audio adjustment.



## Preferences menu

**Immediate Changes** — Causes changes to take effect immediately.

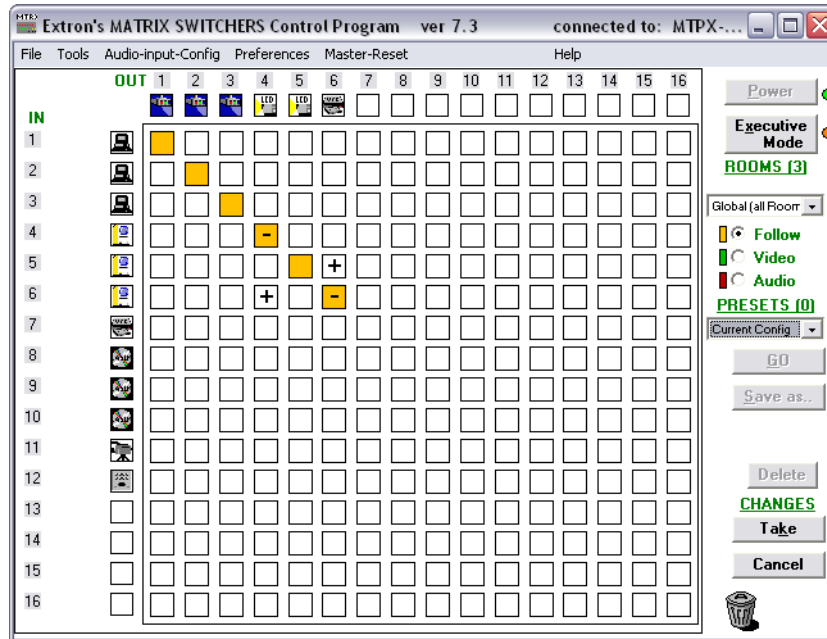
**Hold/Verify Changes** — Delays implementation of changes until the **Changes – Take** button is clicked.

**Ties as Lines** — Displays ties as lines (see figure 69).



**Figure 69. Ties Shown as Lines**

**Ties as Crosspoints** — Displays ties as a matrix of inputs and outputs (see figure 70).



**Figure 70. Ties Shown as Crosspoints**

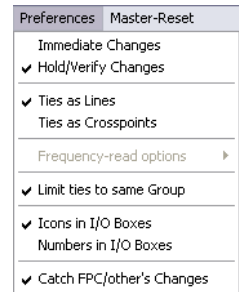
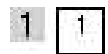
- **Video and audio** ties are indicated as **amber** check boxes.
- **Video-only** ties are indicated as **green** check boxes.
- **Audio-only** ties are indicate as **red** check boxes.
- Ties that will take effect when you click the Take button are indicated by a + in the check box.
- Ties that will be broken when you click the Take button are indicated by a – in the check box.

**Limit ties to same group** — Allows you to limit the creation of ties using the program to inputs and outputs that are in the same group (similar to front panel operation).

**Icons in I/O Boxes** — Erases any numbers in the I/O boxes in either the ties-as-lines window or the ties-as-boxes window. You can place icons in the boxes.



**Numbers in I/O Boxes** — Erases any icons in the I/O boxes in either the ties-as-lines window or the ties-as-boxes window, and fills each box with the associated input or output number.



**Catch FPC/others changes** — When checked, sets the switcher to report all configuration and setting changes to the serial port or Ethernet connection that turned this selection on. These reports allow the Matrix Switchers Control Program to track the changes that occur in the configuration and settings of the switcher, whether commanded via the front panel, a serial port, the USB port (MTPX Plus 128 only), or the Ethernet port.

### Master-Reset selection

Master-Reset

Master reset performs all of the following functions:

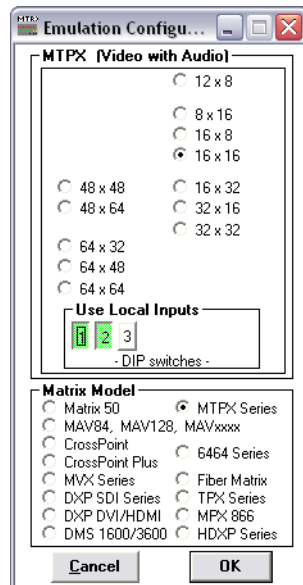
- Clears all ties
- Clears all presets
- Clears all audio or RS-232 mutes
- Resets all I/O grouping
- Sets all input audio levels to unity gain (0 dB)
- Sets all output volume levels to 100% (0 dB of attenuation)

**NOTE:** Master reset does not reset the Internet protocol (IP) settings.

## Using Emulation Mode

*Emulation* mode allows you to set up the software without attaching the switcher to the computer. To use Emulation mode, do the following:

1. Click **Start > Programs > Extron Electronics > Matrix Switchers > MATRIX Switcher + Control Pgm.**
2. Choose **Emulate**, and click **OK**.
3. Choose an emulation file to open, and click **OK**. The file DEMO.MTX provides a sample of a completed matrix setup. The file NEW.INI provides a blank setup to get you started.
4. Enter the file name under which you want to save any changes to the file, and click **OK**.
5. Select **MTPX Series** as the matrix model, select the correct matrix size, select (green) the desired local inputs emulation, and click **OK** (see figure 71).



**Figure 71. Emulation Mode Configuration**

6. Continue using the program as described in the “Starting and using the program” section.

## Using the Help System

For information about program features, you can access the help program in any of the following ways:

- From the Extron Electronics program folder or group, double-click the MATRIX Switcher Help icon (shown at right).
- From within the Matrix Switcher Control Program, click **Help > Contents** on the menu bar.
- From within the Matrix Switcher Control Program, press the <F1> key.



## Optimizing the Video

Each TP input has a level and peaking adjustment. Most MTP transmitters and half of the MTPX Plus TP outputs have a pre-peaking feature. TP inputs and outputs have skew adjustments. Set these adjustable features as follows for the best image quality:

- NOTES:**
- For all of the settings in this section (with the exception of the Pre-Peak switch on the **transmitter** in step **1**), see the MTPX Pictures settings and MTPX configuration settings menu items in “**Tools menu**”, on page 114. These settings can also be made using SIS commands (see the “**Programming Guide**” section) or the built-in HTML pages (see the “**HTML Operation**” section).
  - Unless the TP cables are changed, these adjustments should need to be made only once, during installation.

Before you start optimizing, set all input level and peaking, input and output skew, and output pre-peak settings to either zero or off.

### MTP Transmitter Pre-Peak Selection

**For inputs from MTP T 15HD products only** — If the cable between the MTP transmitter and the MTPX Plus is 300 feet (91.4 m) or longer, turn the Pre-Peak switch on the transmitter to on. For shorter cables, turn the switch off.

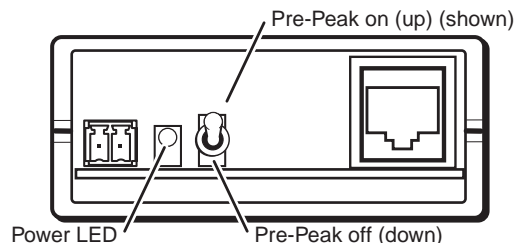
### MTPX Level/Peaking Setting

#### Auto calibration

The simplest and surest way to set the input level/peaking is to use the MTP signal generator (included with most models, optional for the MTPX Plus 128) and the Auto-calibration utility within the Matrix Switchers Control Program as follows:

**NOTE:** To manually set the input level/peaking, see “**Manual calibration.**”

1. Disconnect the power and RJ-45 cables at the MTP transmitter connected to the input to be adjusted.
2. Connect the two cables to the MTP signal generator.
3. If the input cable between the transmitter and the MTPX Plus is longer than 300 feet (91.4 m), place the Pre-Peak switch on the MTP signal generator to on (see figure 72).



**Figure 72.** MTP Signal Generator

**NOTE:** The MTP signal generator does not work on cable lengths over 400 feet (120 m). Set the level/peaking to its maximum value of 255.

4. In the Matrix Switchers Control Program, click **Tools > MTPX Picture settings** to open the MTPX Picture Settings window (see **figure 66** on page 115).

5. Click the **Auto-Calibrate Level/Peaking** button.  
After a few moments, the program reports whether or not the calibration succeeded and the original and new settings for the input Pre-Peaking adjustment.
6. Disconnect the power and RJ-45 cables from the MTP signal generator and reconnect them to the MTP transmitter.
7. Repeat steps **1** through **6** for each input.

### Manual calibration

If you choose **not** to auto calibrate, or if you want to fine tune the adjustment, you can manually set the values as follows:

1. Connect an oscilloscope (preferred) or a monitor (acceptable) to local output (VGA output) 1.
2. **If using an oscilloscope**, apply a white field test pattern to the input to be optimized via an MTP transmitter.  
**If using a monitor**, apply a grayscale or color bars test pattern to the input to be optimized via an MTP transmitter.

**TIP:** The Extron VTG 300 or VTG 400 are recommended to provide the test pattern.

3. Tie the input to be optimized to output 1.
4. Observe the oscilloscope or the monitor with a critical eye while you adjust the input level/peaking setting to compensate for signal loss between the transmitter and the MTPX.
5. If necessary, repeat steps **1** through **4** for each input.

### MTPX Skew Setting

The MTPX has skew adjustments on the inputs and the outputs. Both should be set to compensate for signal skew across all ties. Adjust input and output skew as follows:

**TIP:** The Extron VTG 300 or VTG 400 are recommended to provide the test pattern.

- NOTES:**
- When the skew adjustment is set to zero, the MTPX Plus cannot shift the rightmost video image to the left.
  - A 2-nanosecond adjustment is very fine. Up to 10 nanoseconds of delay may be necessary before you detect a change in the display.

### Input skew

1. Connect an oscilloscope (preferred) or a monitor (acceptable) to local output (VGA output) 1.
2. Apply a crosshatch test pattern to the input to be optimized via an MTP transmitter.
3. Tie the input to be optimized to output 1.
4. Use the test equipment or examine the displayed video image with a critical eye to determine which video signal — red, green, or blue — is most shifted to the left.
5. Adjust the leftmost video signal to the right until all three colors are properly converged.
6. If either of the two the remaining colors is left shifted, repeat steps **4** and **5**.
7. Repeat steps **2** through **6** for all other inputs.

## Output skew

1. Connect an oscilloscope (preferred) or a monitor (acceptable) to the TP output to be adjusted, via an MTP receiver.
2. Apply a crosshatch test pattern to one the local (VGA) inputs.
3. Tie the local input receiving the test pattern signal to the output to be optimized.
4. Use the test equipment or examine the displayed video image with a critical eye to determine which video signal — red, green, or blue — is most shifted to the left.
5. Adjust the leftmost video signal to the right until all three colors are converged.
6. If either of the two the remaining colors is left shifted, repeat steps 4 and 5.
7. Repeat steps 2 through 6 for all other outputs.

## MTPX Plus Pre-Peak Selection

**NOTE:** MTPX Pre-Peak is available on the first 25% of the MTPX Plus outputs (for example, outputs 1 through 4 for an MTPX Plus 168).

If the cable between the MTPX Plus and the receiver is longer than 300 feet, turn the Pre-Peak feature on the MTPX Plus to on. For shorter cables, turn the feature off.

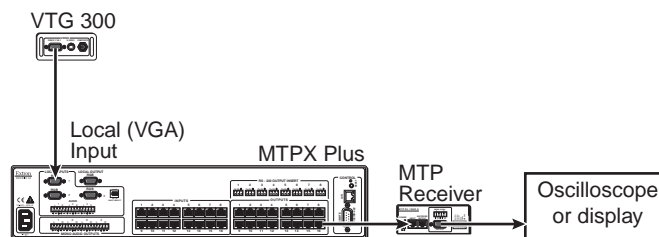
## MTP Receiver Level/Peaking Setting

If level/peaking is available on the connected receivers, adjust it as follows:

1. **If using an oscilloscope**, apply a white field test pattern to one the local (VGA) inputs on the MTPX Plus (see [figure 73](#)).
- If using a monitor**, apply a Color Bars test pattern to one the local (VGA) inputs on the MTPX Plus.

**TIP:** The Extron VTG 300 or VTG 400 are recommended to provide the test pattern.

2. Tie the local input receiving the test pattern signal to the output connected to the MTP receiver to be optimized.



**Figure 73.** Connections for Setting the Level and Peaking on the Receiver

3. Connect an oscilloscope or monitor to the output of the MTP receiver.
4. Adjust the level/peaking on the receiver in accordance with the applicable MTP product manual.
5. Repeat steps 2 through 4 for each receiver to be optimized.

## Button-Label Generator Program

The Button Label Generator software creates labels that you can place in the translucent covers of the input and output selection buttons. You can create labels with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection (see the “**Button Labels**” in the “Reference Information” section for the procedure for removing and replacing the translucent covers).

The Extron Button Label Generator is available on the Extron Web site, [www.extron.com](http://www.extron.com), under the Download Center tab. Click the Software link (see figure 74), and download and install the program on your PC.



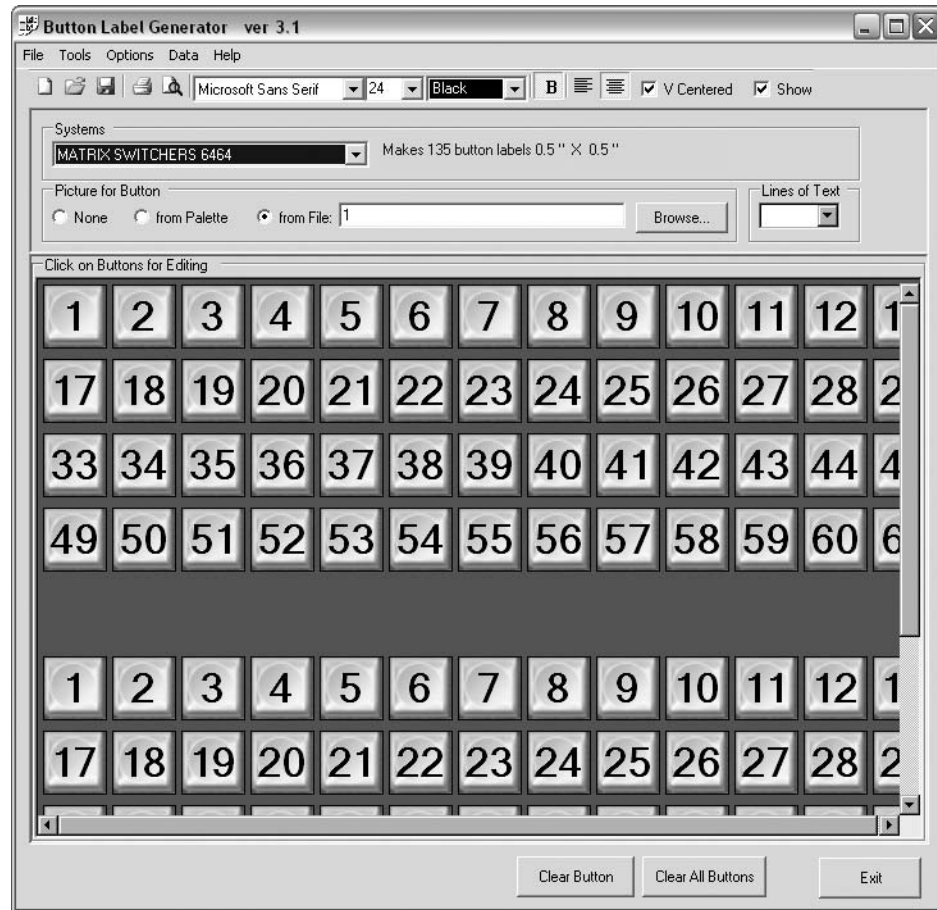
**Figure 74.** Location of Software on the Website

**NOTE:** The Button Label Generator software is also included on the Extron Software Products Disk that accompanied the switcher.

By default, the Windows installation creates a `C:\Program Files\Extron\ButtonLabelGenerator` directory and places the Button Label Generator icon into a group or folder named “Extron Electronics.”

## Using the Button-Label Generator Software

1. To run the Button-Label Generator program, click **Start > Programs > Extron Electronics > Button Label Generator > Button Label Generator**. The Button-Label Generator window appears (see figure 75).



**Figure 75.** Extron Button-Label Generator Window

2. In the Systems selection box, choose the **Matrix Switchers 6464** option to match the button label size and quantities for your MTPX Plus switcher.
3. Using normal Windows controls, you can create and print labels that can be placed in the label windows on the front panel of the switcher.

**NOTE:** For best results, print on transparent or translucent material.

4. Click the **Clear All Buttons** button and create new labels as many times as necessary to make all of the button labels that you need.

To access the help program, click the Help menu.



# HTML Operation

This section introduces using the built-in HTML pages to operate the MTPX Plus Matrix Switchers, including:

- **Download the Startup Page**
- **Status Tab**
- **Configuration Tab**
- **File Management Tab**
- **Control Tab**

The switcher can be controlled and operated through its LAN port, connected via a LAN or WAN, using a web browser such as the Microsoft Internet Explorer. The display in the browser of the status or operation of the switcher has the appearance of web pages. This chapter describes the factory-installed HTML pages, which are always available and cannot be erased or overwritten.

**NOTE:** If your Ethernet connection to the matrix switcher is unstable, try turning off the proxy server in your Web browser. In Microsoft Internet Explorer, click **Tools > Internet Options > Connections > LAN Settings**, uncheck the **Use a proxy server...** box, and then click **OK**.

## Download the Startup Page

Access the switcher using HTML pages as follows:

1. Start the Web browser program.
2. Click in the **Address** field of the browser.
3. Enter the Matrix IP address in the **Address** field of the browser.

**NOTE:** If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.

4. If you want the browser to display a page other than the default page (such as a custom page that you have uploaded), enter a slash (/) and the file name to open.

**NOTES:**

- The **Address** field of the browser should display the address in the following format: `<xxx.xxx.xxx.xxx>/<optional_file_name>.html`.
- The HTML language reserves certain characters for specific functions (see “**Special Characters**” in the “Programming Guide” section).

5. Press the keyboard <Enter> key. The switcher checks to see if it is password protected. If the switcher is not password protected, it checks and downloads the HTML pages (proceed to step 7).

If the switcher is password protected, the switcher downloads the Enter Network Password page (see figure 76).



**Figure 76. Enter Network Password Page**

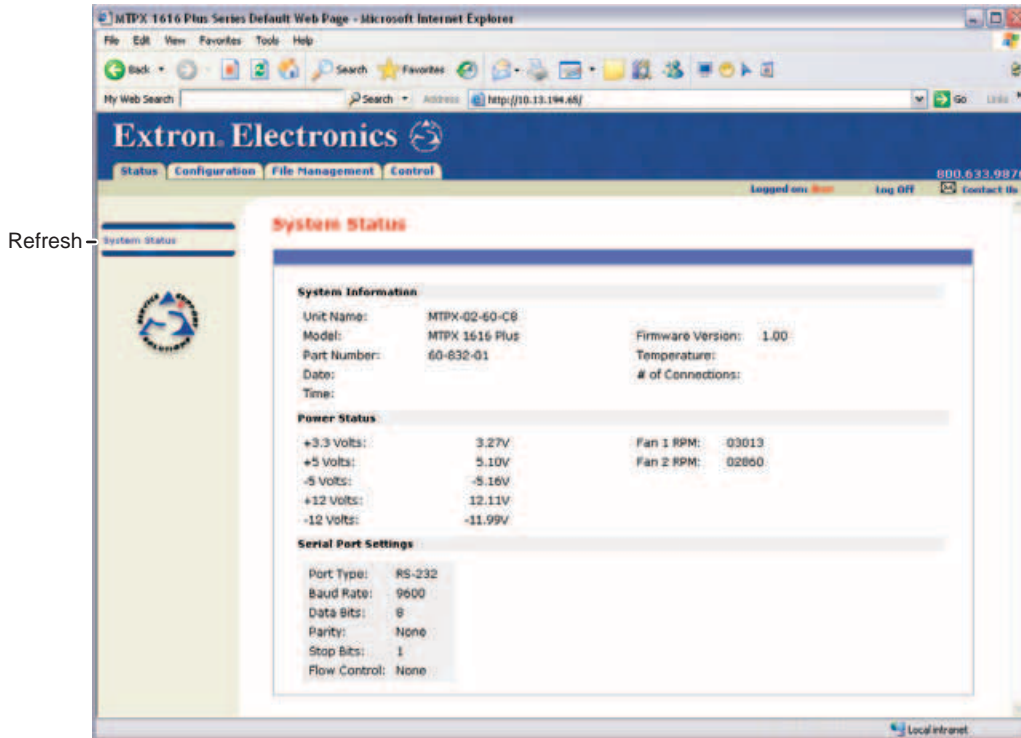
**NOTE:** A User name entry is not required.

6. Click in the **Password** field and type in the appropriate administrator or user password. Click the **OK** button.
7. The switcher checks several possibilities, in the following order, and then responds accordingly:
  - Does the address include a specific file name, such as `10.13.156.10/<file_name>.html`?  
**If so**, the switcher downloads that HTML page.
  - Is there a file in the switcher memory that is named “`index.html`”?  
**If so**, the switcher downloads “`index.html`” as the default startup page.
  - **If neither of the above conditions is true**, the switcher downloads the factory-installed default startup page, “`nortxe_index.html`” (see **figure 77** on the next page), also known as the System Status page.

# Status Tab

## System Status Page

The System Status page (see **figure 77**) provides an overall view of the status of the matrix switcher, including individual voltages, and the serial port status. The System Status page is the default page that the switcher downloads when you connect to the switcher. Access the System Status page from other pages by clicking the Status tab.



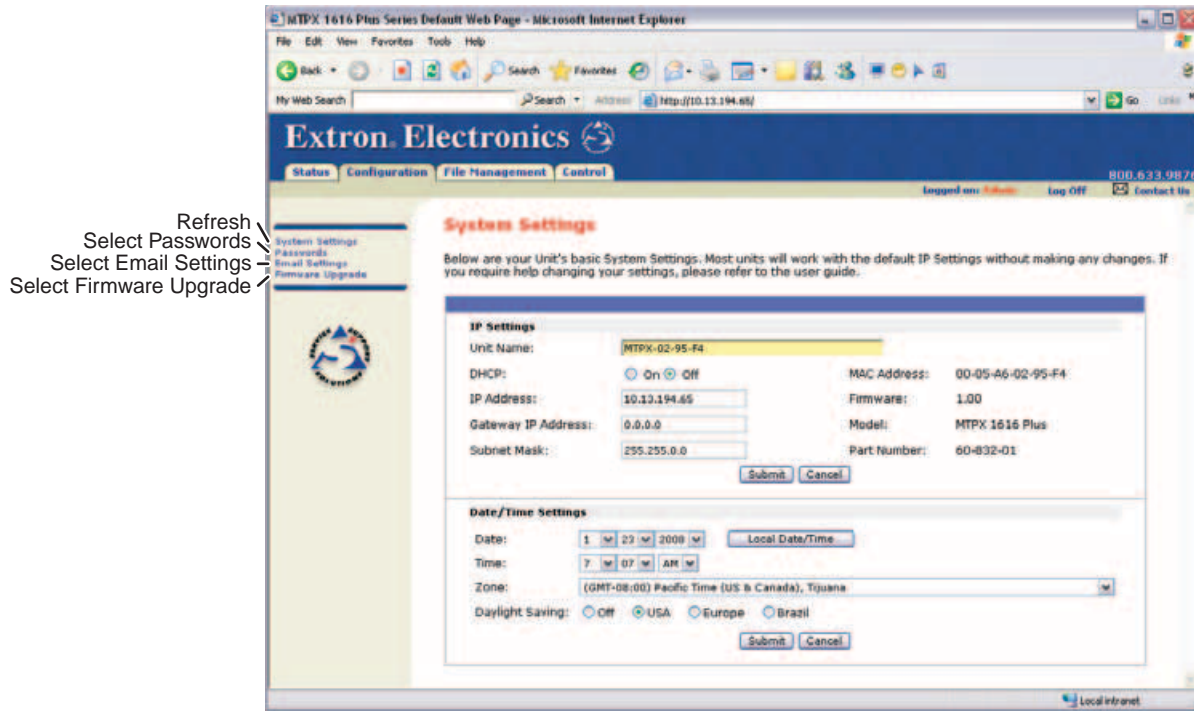
**Figure 77.** System Status Page

The status web page periodically updates itself to reflect the latest status of the switcher components. If a value changes, the display shows the change in status the next time it updates.

# Configuration Tab

## System Settings Page

The MTPX Plus switcher downloads the System Settings page (see **figure 78**) when you click the **Configuration** tab. The screen consists of fields in which you can view and edit IP administration and system settings. You can access the Email Settings and Passwords pages by clicking the appropriate link. See “**Ethernet Link**” on page 146 for basic information about IP addresses and subnetting.



**Figure 78.** System Settings Page

On password-protected connections, there are two levels of protection: administrator and user. Administrators have full access to all switching capabilities and editing functions. Users can create ties, create and recall presets, set audio or RS-232 mutes, and view all settings with the exception of passwords.

### IP Settings fields

The IP Settings fields provide a location for viewing and editing settings unique to the Ethernet interface. After editing any of the settings on this page, click the **Submit** button at the bottom of the page.

### Unit Name field

The Unit Name field contains the name used as the “from” information when the switcher e-mails notification of its failed or repaired status. This name field can be changed to any valid name, up to 24 alphanumeric characters.

**NOTE:** The HTML language reserves certain characters for specific functions (see “**Special Characters**” in the “Programming Guide” section).

### ***DHCP radio buttons***

The **DHCP On** radio button directs the switcher to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). The **DHCP Off** radio button turns DHCP off. Contact the local system administrator to determine if DHCP is appropriate.

### ***IP Address field***

The **IP Address** field contains the IP address of the connected switcher. This value is encoded in the flash memory of the switcher.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric octets separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

The factory-installed default address is 192.168.254.254, but if this conflicts with other equipment at your installation, you should ask your network administrator for a new, valid address.

**NOTE:** IP address changes can cause conflicts with other equipment. Only local system administrators should change IP addresses.

### ***Gateway IP Address field***

The **Gateway IP Address** field identifies the address of the gateway to the mail server to be used if the switcher and the mail server are not on the same subnet.

The gateway IP address has the same validity rules as the system IP address.

### ***Subnet Mask field***

The **Subnet Mask** field is used to determine whether the switcher is on the same subnet as the mail server when you are subnetting. For more information, see "**Subnetting — A Primer**".

### ***MAC Address field***

The Media Access Control (MAC) Address is hardcoded in the switcher and cannot be changed.

### ***Firmware field***

The **Firmware** field identifies the installed firmware version. This field is hardcoded in the switcher and cannot be changed.

### ***Model field***

The **Model** field identifies the number of video and audio inputs and outputs. This field is hardcoded in the switcher and cannot be changed.

### ***Part Number field***

The **Part Number** field identifies the part number of your switcher. This field is hardcoded in the switcher and cannot be changed.

## Date/Time Settings fields

The Date/Time Settings fields (see figure 79) provide a location for viewing and setting the time functions.

The screenshot shows a web form titled "Date/Time Settings". It contains the following elements:

- Date:** Three dropdown menus for month (11), day (14), and year (2005).
- Time:** Two dropdown menus for hours (2) and minutes (35).
- Zone:** A dropdown menu currently showing "(GMT-08:00) Time (US & Canada), Tijuana". A scrollable list of years from 2005 to 2015 is visible next to it.
- Daylight Savings:** Two radio buttons, "Off" and "On", with "On" selected.
- Buttons:** "Submit" and "Cancel" buttons.

**Figure 79. Date/Time Settings Fields**

Change the date and time settings as follows:

1. Click the drop box for the desired value. The adjustable variables are month, day, year, hours, minutes, AM/PM, and (time) zone. A drop-down scroll box appears (the year drop box is selected in figure 79).
2. Click and drag the slider or click the scroll up button or the scroll down button until the desired value is visible.
3. Click the desired value.

**NOTES:**

- If setting the time, set the local time. The Zone variable allows you to then enter the offset from Greenwich Mean Time (GMT).
- The Zone field identifies the standard time zone selected and displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.

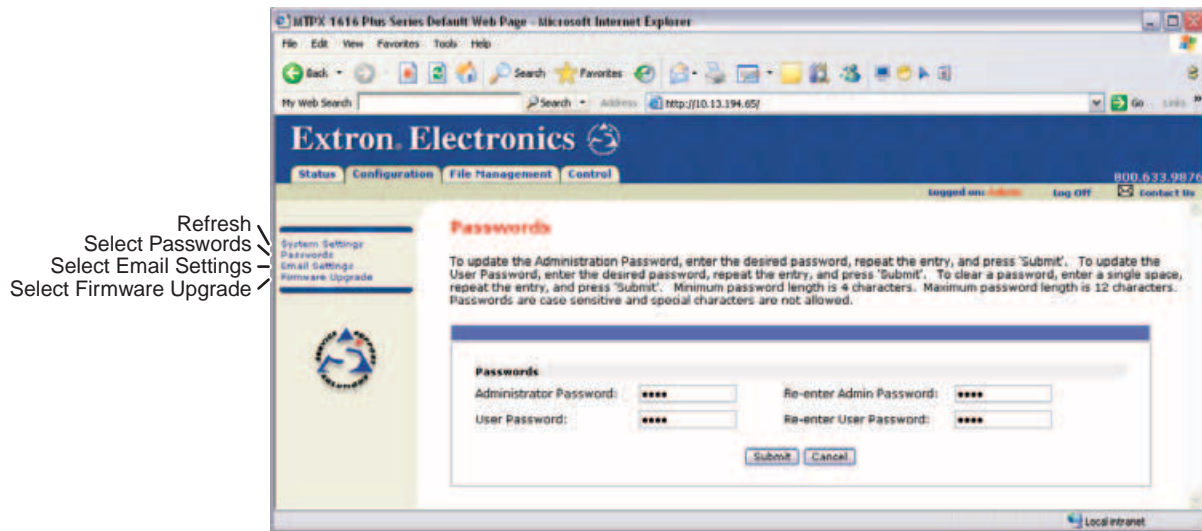
4. Repeat steps 1 through 3 for other variables that need to be changed.
5. If appropriate, select the appropriate Daylight Savings radio button to turn on the daylight savings time feature for your region or nation.

**NOTE:** When Daylight Savings Time is turned on, the switcher automatically updates its internal clock between Standard Time and Daylight Savings Time in the spring and fall on the date that the time change occurs in the country or region selected. When Daylight Savings Time is turned off, the switcher does not adjust its time reference.

6. Click the Submit button.

## Passwords Page

Access the Passwords page (see figure 80) by clicking the **Passwords** link on the System Settings page.



**Figure 80. Passwords Page**

**NOTE:** If the switcher is password protected, fields on this page can be edited only by people logged in as administrators.

The fields on the Passwords page are for entering and verifying administrator and user passwords. Passwords are case sensitive and are limited to up to 12 upper-case and lower-case alphanumeric characters. Each password must be entered twice; once in the Password field and then again in the Re-enter Password field. Characters in these fields are masked by asterisks (\*\*\*\*\*). If you do not want to password protect an access level, leave the Password field and the Re-Enter Password field blank. After entering the password in both fields, click the Submit button.

**NOTE:** An administrator password must be created before a user password can be created.

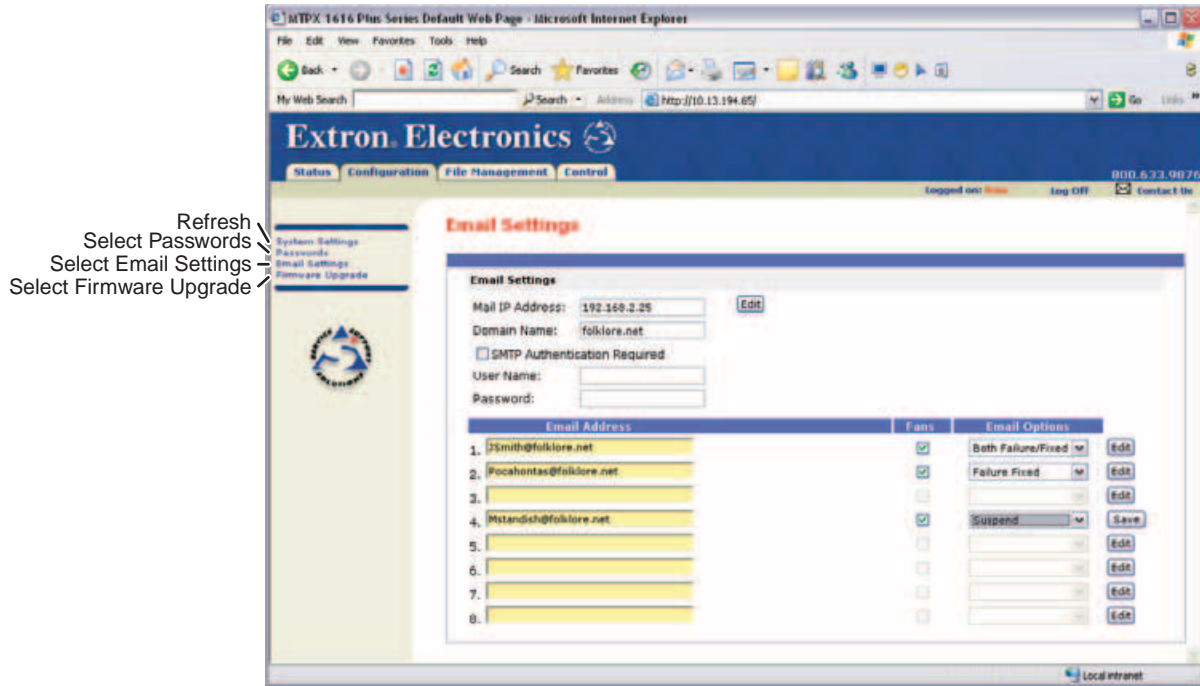
### Resetting a password

Reset an existing password so that no password is required as follows:

1. Clear any existing password.
2. Enter a single space character in the **Password** and **Re-enter Password** fields.
3. Click the **Submit** button.

## Email Settings Page

Reach the Email Settings page (see **figure 81**) by clicking the **Email Settings** link on the System Settings page. The Email Settings page has fields for setting up the e-mail notification capabilities of the switcher. For the e-mail settings and for each row of the e-mail notification settings, click the **Edit** button to make the fields available for editing. The button changes to **Save**. After editing the settings associated with the **Edit/Save** button, click the **Save** button.



**Figure 81.** Email Settings Page

### Mail IP Address field

The Mail IP Address field displays the IP address and the domain name of the mail server that handles the e-mail for the facility in which the switcher is installed.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric octets separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to three digits total per field, are optional. Values of 256 and above are invalid.



## Setting up SMTP authorization

If desired, set the MTPX Plus to require SMTP authorization before accepting any e-mail as follows:

1. Click **Edit**. The button changes to **Save**.
2. Check the **SMTP Authorization Required** check box, located below the **Domain Name** field. This enables the **User Name** and **Password** fields below the check box.
3. Enter a user name and a password in the **User Name** and **Password** fields. For the MTPX Plus to accept their e-mail messages, senders must enter the user name and password.

**NOTES:**

- For the User name, any combination of letters, numerals, spaces, and symbols except the comma (,) and the single and double quotation marks (' and ") are valid. For the password, all characters except the comma are valid. The user name and password can each be from 1 to 30 characters.
- Both a user name and a password must be specified.

4. Click **Save** to save the user name and password.

## Deselecting SMTP authorization

Remove SMTP authorization as follows:

1. Click **Edit**. The button changes to **Save**.
2. Click (deselect) the **SMTP Authorization Required** check box.
3. Click **Save**.

## Domain Name field

The Domain Name field displays the domain name that the MTPX Plus switcher uses to log on to the e-mail server. Standard domain name conventions (for example: xxx.com) apply.

**NOTE:** The HTML language reserves certain characters for specific functions (see “**Special Characters**” in the “Programming Guide” section). The @ character is acceptable only as the lead-in to the domain name (such as @folklore.net).

## Email Address fields

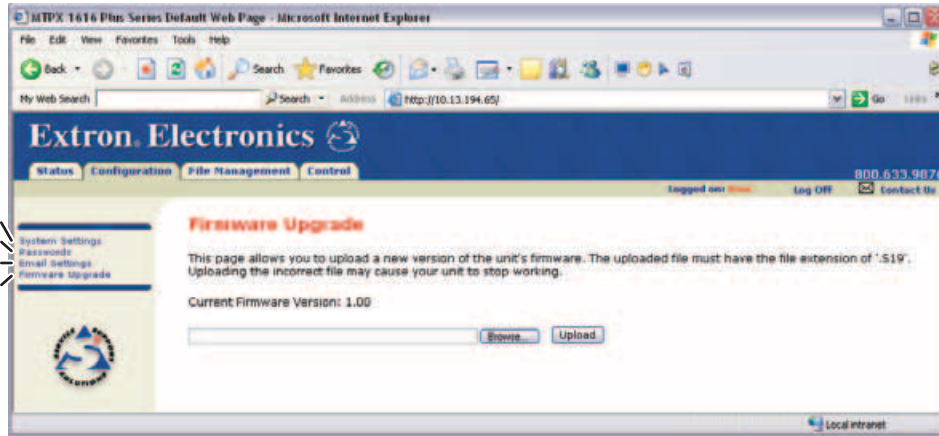
The eight **Email Address** fields identify the e-mail addresses of the personnel to whom the MTPX Plus switcher e-mails notification of its failure and repair status. Standard e-mail address conventions (nnnnn@xxx.com) apply.

The **Fans** check boxes and drop boxes associated with each address field permit the operator to specify specific criteria under which the switcher will e-mail recipients. Check the **Fans** boxes to monitor the cooling. In the associated **Email Options** drop box, select whether the recipient is to be e-mailed of failures, fixes, both, not notified, or to be removed from the e-mail list. The **Suspend** option is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as on travel or vacation. Deleting an e-mail addressee and clicking the **Save** button removes the recipient from e-mail notification completely.

## Firmware Upgrade Page

The Firmware Upgrade page provides another way to replace the firmware that is coded on the control board of the switcher without taking the switcher out of service.. Access the Firmware Upgrade page (see figure 82) by clicking the **Firmware Upgrade** link on the System Settings page.

Refresh  
Select Passwords  
Select Email Settings  
Select Firmware Upgrade



**Figure 82. Firmware Upgrade Page**

Update the switcher firmware as follows:

**NOTE:** The Firmware Upgrade page is **only** for replacing the firmware that controls all switcher operation. To insert your own custom HTML pages, see “**File Management Page**”, on page 136.

1. Get the firmware (see “**Updating the Firmware**” in the “Matrix Software” section, steps **1** through **6** and then return to this section).
2. Connect the PC to the MTPX Plus switcher via the LAN port of the switcher.
3. Access the MTPX Plus switcher using HTML pages.
4. Click the **Configuration** tab.
5. Click the **Firmware Upgrade** link.
6. Click the **Browse** button. An open file window appears.
7. Navigate to the folder where you saved the firmware upgrade file and select it.

**CAUTION:** The firmware file must have an .s19 extension. Other file types can cause the switcher to stop functioning.

**NOTES:**

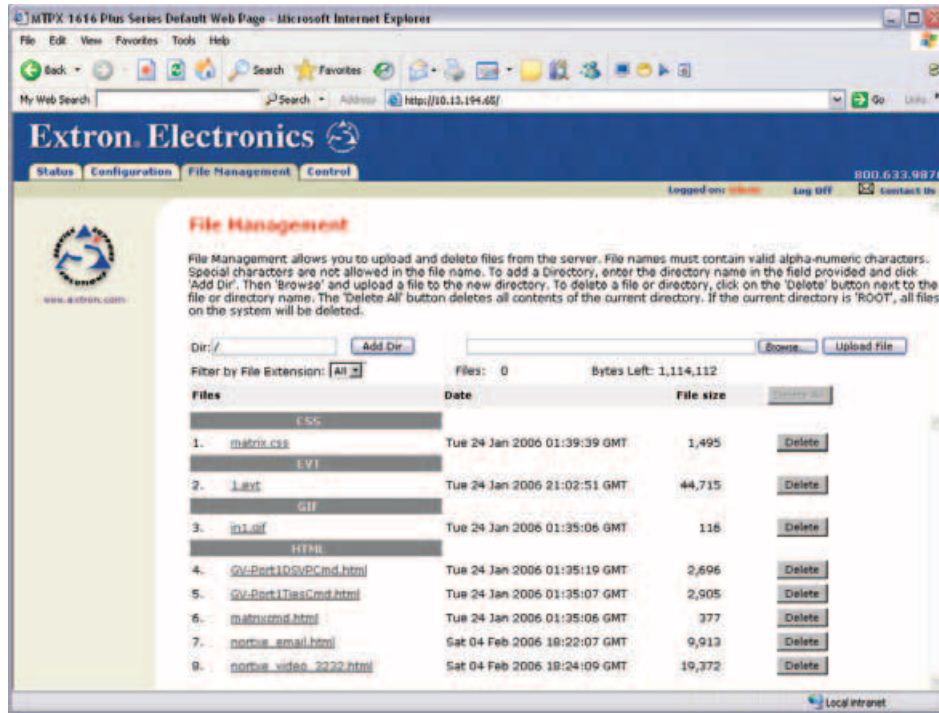
- When downloaded from the Extron website, the firmware is placed in a subfolder of C:\Program Files\Extron\Firmware.
- The original factory-installed firmware is permanently available on the matrix switcher. If the attempted firmware upload fails for any reason, the switcher reverts to the factory-installed firmware.

8. Click the **Open** button.
9. Click the **Upload** button. The firmware upload to the MTPX Plus switcher may take a few minutes.

# File Management Tab

## File Management Page

To delete files such as user-supplied HTML pages from the switcher or to upload your own files to the switcher, click the **File Management** tab. The switcher downloads the file management HTML page (see figure 83).



**Figure 83.** File Management Page

**NOTE:** The files listed in figure 83 are shown for example only and may not be present on your switcher.

To delete a file, check the associated delete check box and click the Delete Files button. Upload your own files as follows:

**NOTE:** The HTML language reserves certain characters for specific functions (see “**Special Characters**” in the “Programming Guide” section).

1. Click the **Browse** button.
2. Browse through your system and select the desired file of files.

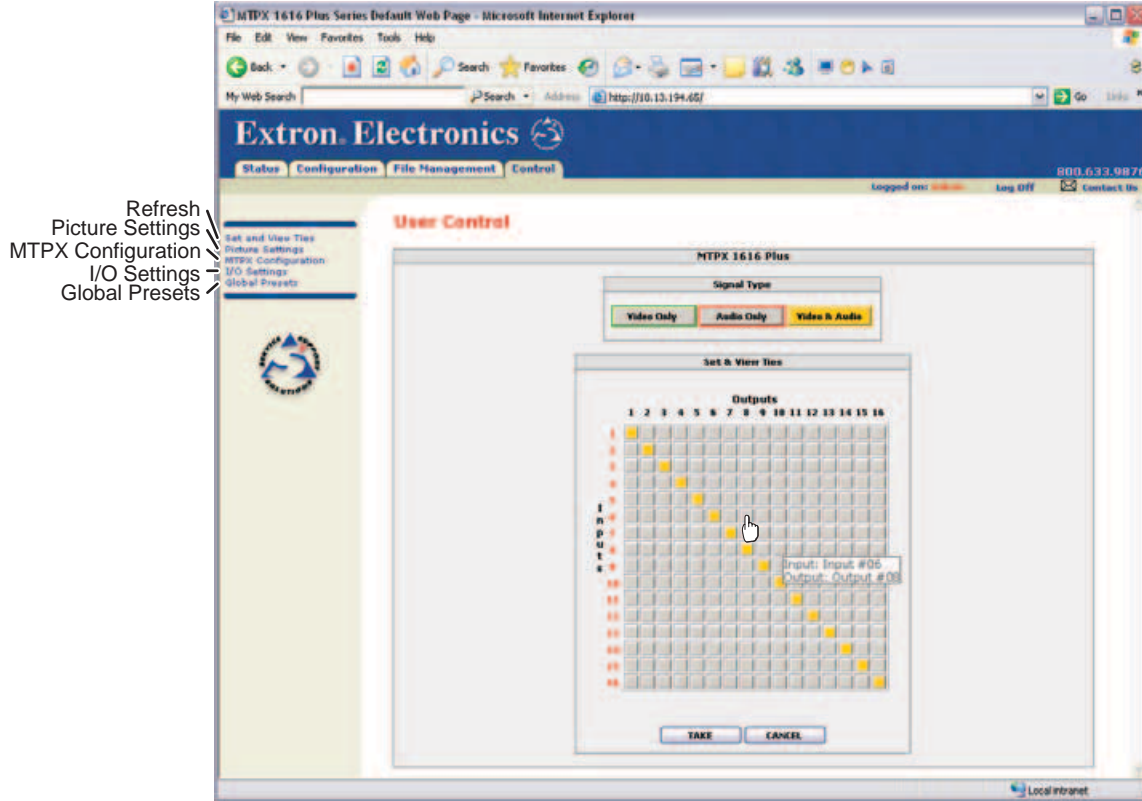
**NOTE:** If you want one of the pages that you create and upload to be the default startup page, name that file “index.html”.

3. Click the **Upload File** button. The file(s) that you selected appear in the list.

# Control Tab

## User Control page

You can create ties on the User Control page (see figure 84). Access the User Control page by clicking the **Control** tab.



**Figure 84.** User Control Ties page

The page consists of a matrix of input (rows) and output (columns) selection buttons of four different colors:

- The **amber** buttons indicate **video and audio ties**.
- The **green** buttons indicate **video only ties**.
- The **red** buttons indicate **audio only ties**.
- The **gray** buttons indicate **no ties**.

**NOTE:** If you lose track of the input and output associated with a specific button, let the mouse pointer rest over a button for a moment. As shown in figure 84, a field pops up that identifies the input and output for that button.

## Creating a tie

Select and switch an input as follows:

1. Click the **Video Only**, **Audio Only**, or **Video & Audio** button to select video, audio, or both for switching (audio follow or audio breakaway). Each mouse click on a button toggles the other two buttons off.
2. Move the mouse over the matrix of input and output selection buttons. Click a button to create a pending tie (if a tie does not exist) or pending untie (if a tie exists) of the input and output associated with that button. A "P" (for pending) appears in the button.

**NOTES:**

- If you lose track of the input and output associated with a specific button, let the mouse rest over one of the tie buttons for a moment. A field pops up (as shown on figure 84) that identifies the input and output for that button.
- To tie an input to all outputs, click that input number.

3. Click the **Take** button to make the configuration changes or the **Cancel** button to abandon the configuration changes.

## Picture Settings Page

The Picture Settings page provides a way to set the input level/peaking, the output pre-peaking, and the input and output skew settings. Access the Picture Settings page (see figure 85) by clicking the **Picture Settings** link on the Control page.

Set and View Ties  
Refresh  
MTPX Configuration  
I/O Settings  
Global Presets

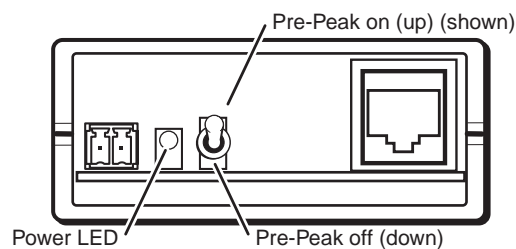
Input	Level/Peaking	Skew (ns)	Output	Pre-Peaking	Skew (ns)
1i	129 Auto	R: 20 G: 22 B: 22	1o	<input type="checkbox"/>	R: 0 G: 0 B: 0
2i	102 Auto	R: 20 G: 22 B: 22	2o	<input type="checkbox"/>	R: 0 G: 0 B: 0
3i	0 Auto	R: 0 G: 0 B: 0	3o	<input type="checkbox"/>	R: 0 G: 0 B: 0
4i	0 Auto	R: 0 G: 0 B: 0	4o	<input type="checkbox"/>	R: 0 G: 0 B: 0
5i	0 Auto	R: 0 G: 0 B: 0	5o	<input type="checkbox"/>	R: 0 G: 0 B: 0
6i	0 Auto	R: 0 G: 0 B: 0	6o	<input type="checkbox"/>	R: 0 G: 0 B: 0
7i	0 Auto	R: 0 G: 0 B: 0	7o	<input type="checkbox"/>	R: 0 G: 0 B: 0
8i	0 Auto	R: 0 G: 0 B: 0	8o	<input type="checkbox"/>	R: 0 G: 0 B: 0
9i	0 Auto	R: 0 G: 0 B: 0	9o	<input type="checkbox"/>	R: 0 G: 0 B: 0

Figure 85. Picture Settings Page

## Changing the input level/peaking

Users can set the level/peaking value (from 000 through 255) for each input from the Picture Settings page. Level/peaking can be adjusted to compensate for longer cable runs on the inputs. Change the level/peaking setting for an input in any of the following three ways:

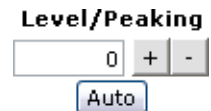
- Use the auto calibration function as follows:
  1. Disconnect the power and RJ-45 cables at the MTP transmitter connected to input to be calibrated.
  2. Connect the two cables to the MTP signal generator (included with most models, optional for the MTPX Plus 128).
  3. If the input cable is longer than 300 feet (91.4 m), place the Pre-Peak switch on the MTP signal generator to on (up when the RJ-45 connector on the signal generator is to the right [see figure 86]). If the cable is shorter than 300 feet (91.4 m), place the switch down.



**Figure 86.** MTP signal generator

**NOTE:** The MTP signal generator does not work on cable lengths over 400 feet (120 m). Set the level/peaking to its maximum value of 255.

4. Click the **Auto** button.
- Click the Level/Peaking up **+** button or down **-** button for the desired input.
  - Directly enter a value into the Level/Peaking field.



**HINT:** Watch a display as you make adjustments.

## toggling output pre-peaking on and off

Users can toggle the pre-peaking value for each output on and off from the Picture Settings page. Click in the **Pre-Peaking** check box for the desire output to toggle the pre-peaking feature on and off for that output. Pre-peak alters the TP signal output to correct for long cable runs (see **table 1** on page 5 for recommended maximum transmission lengths).

### Pre-Peaking



## Changing the skew

Users can individually set the red, green, and blue skew setting for each input and output from the Picture Settings page. The skew settings correct skew delay (misconvergence) problems commonly encountered when using Category (CAT) 5, 5e, or 6 twisted pair (TP) cables for RGB or component video transmission.



Change skew setting for an input or output as follows:

**NOTE:** For best results, set all three skew values to 0 ns (see steps **2a** and **2b** below) before adjusting for misconvergence.

1. Use UTP cable test equipment or examine the displayed video image with a critical eye to determine which video signal, red, green, or blue, is most shifted to the left.



**NOTE:** A crosshatch test pattern is ideal for evaluating pair skew.

2. Monitor the displayed image. Increase the skew setting for the left-shifted video signal 2 ns at a time as follows:



**NOTE:** The skew compensation function **cannot** shift a video plane farther left than the 0 ns setting.

- a. Click drop box for the desired input or output and the desired video plane. A drop-down scroll box appears.

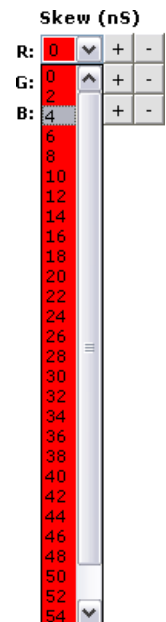
**NOTE:** The red video plane is selected at right.

- b. Click and drag the slider or click on the scroll up  button or the scroll down  button until the desired value is visible.

**NOTES:**

- A 2-nanosecond adjustment is very fine. Up to 10 nanoseconds of delay may be necessary before you detect a change in the display.
- As an alternative to step **2**, or to watch a display as you make adjustments, click on the up  button or down  button.

3. If either of the other video signals is misconverged, repeat steps **2a** and **2b**.



## MTPX Configuration Page

The MTPX Configuration page provides a way to define the content of the audio/RS-232 input, enable the RS-232 output inserts, and tailor the output sync. Access the MTPX Configuration page (see figure 87) by clicking the **MTPX Configuration** link on the Control page.

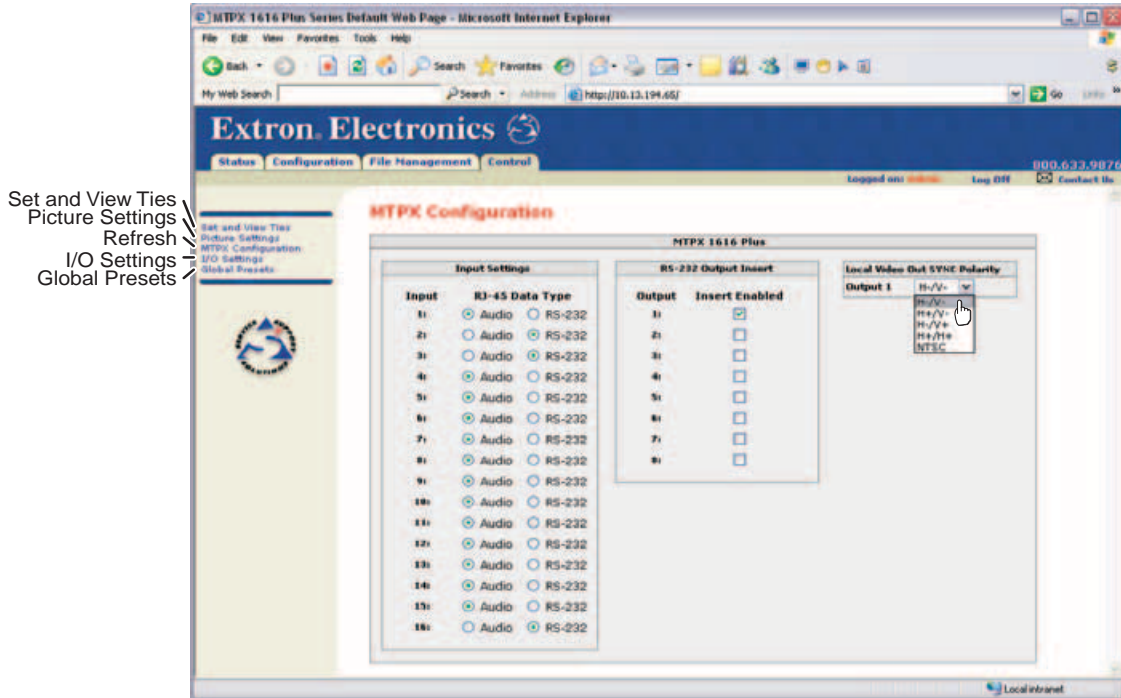
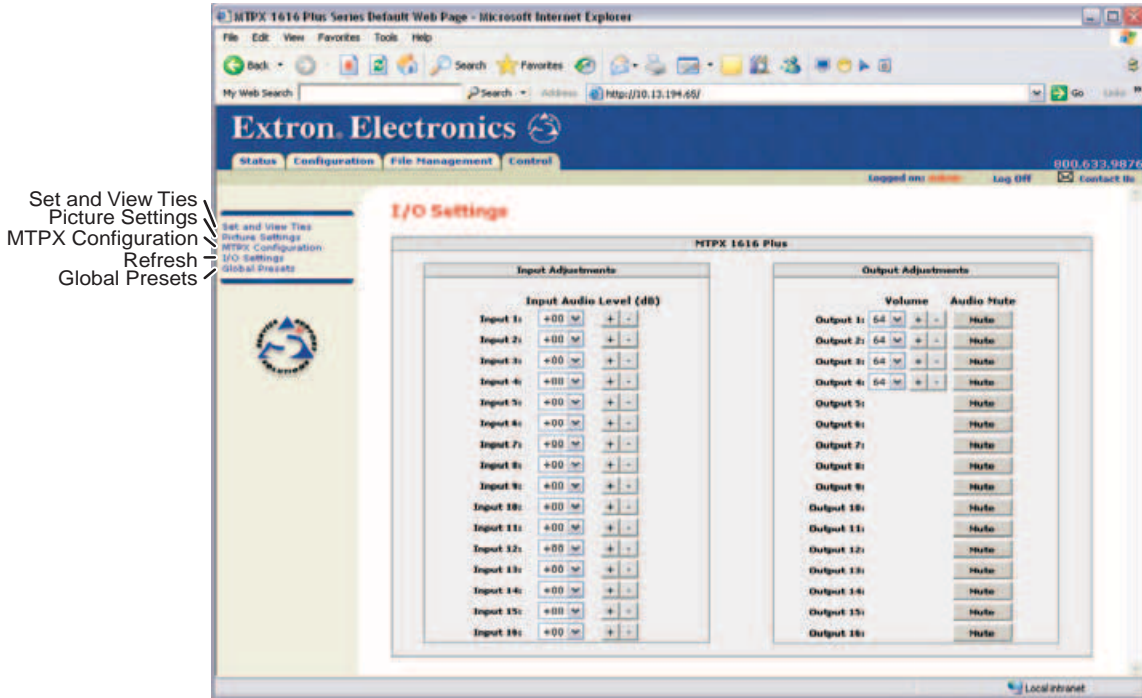


Figure 87. MTPX Configuration Page



## I/O Settings Page

The I/O Settings page provides a way to set the input audio gain and attenuation and the output volume. Access the I/O Settings page (see figure 88) by clicking the **I/O Settings** link on the Control page.



**Figure 88.** I/O Settings Page

### Changing the input gain and attenuation

Users can set the level of audio gain or attenuation (-18 dB to +24 dB) of each input from the I/O Settings page. Audio levels can be adjusted so there are no noticeable volume differences between sources.

Change the gain and attenuation setting for an input as follows:

1. Click the Input Audio Level drop box for the desired input. A drop-down scroll box appears.
2. Click and drag the slider or click on the scroll up ▲ button or the scroll down ▼ button until the desired value is visible.



**NOTE:** As an alternative to steps 1 and 2, or to listen to the audio as you make adjustments, click on the up + button or down - button.

	Input Audio Level (dB)	
Input 1:	+00 ▼	+ -
Input 2:	+11 ▲	+ -
Input 3:	+10	+ -
Input 4:	+09	+ -
Input 5:	+08	+ -
Input 6:	+07	+ -
Input 7:	+06	+ -
Input 8:	+05	+ -
Input 9:	+04	+ -
Input 10:	+03	+ -
Input 11:	+02	+ -
Input 12:	+01	+ -
Input 13:	+00	+ -
Input 14:	-01	+ -
Input 15:	-02	+ -
Input 16:	-03	+ -
	-04	+ -
	-05	+ -
	-06	+ -
	-07	+ -
	-08	+ -
	-09	+ -
	-10	+ -
	-11	+ -
	-12	+ -
	-13	+ -
	-14	+ -
	-15	+ -
	-16	+ -
	-17	+ -
	-18	+ -



## Changing the output volume level

Users can set the volume level for each local audio output volume level from the I/O Settings page. Volume is adjustable through a range of zero steps of attenuation (full attenuation, minimum volume) to 64 steps of attenuation (no attenuation, full volume).

Change the audio volume setting for an output as follows:

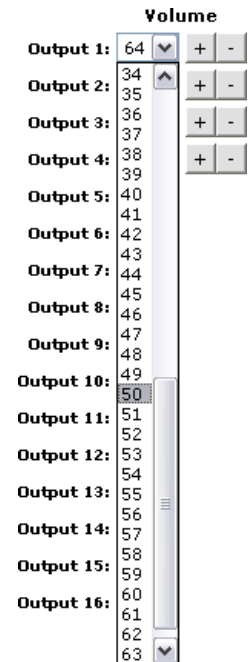
1. Click the **Volume** drop box for the desired output. A drop-down scroll box appears.
2. Click and drag the slider or click on the scroll up  button or the scroll down  button until the desired value is visible.

- NOTES:**

  - As an alternative to steps **1** and **2**, or to listen to the audio as you make adjustments, click on the up  button or down  button.
  - **Table 8**, on the next page, defines the value of each audio volume step.

## Muting and unmuting an audio or RS-232 output

Mute and unmute an audio or RS-232 output by clicking the associated Audio Mute button. Each click toggles the mute status.

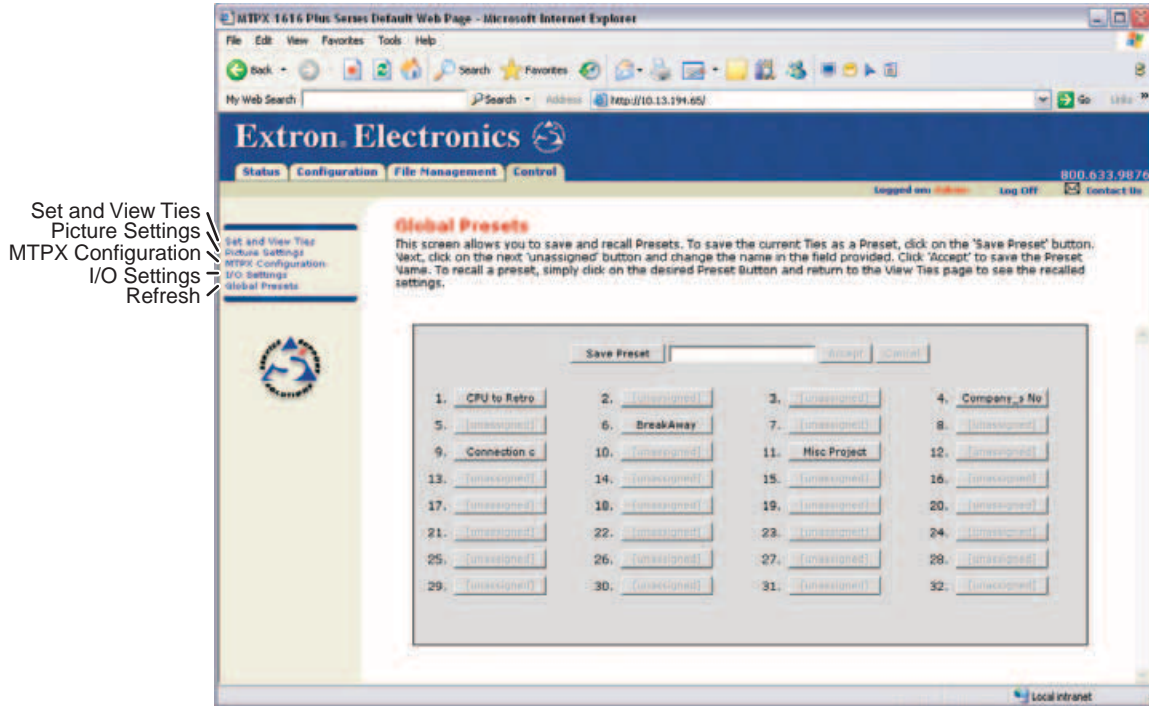


**Table 8. Audio volume adjustment settings**

Number of steps	dB of attenuation	Output volume	Number of steps	dB of attenuation	Output volume	Number of steps	dB of attenuation	Output volume
00	76	0%						
01	63	5.5%	23	41	38.5%	45	19	71.5%
02	62	7%	24	40	40%	46	18	73%
03	61	8.5%	25	39	41.5%	47	17	74.5%
04	60	10%	26	38	43%	48	16	76%
05	59	11.5%	27	37	44.5%	49	15	77.5%
06	58	13%	28	36	46%	50	14	79%
07	57	14.5%	29	35	47.5%	51	13	80.5%
08	56	16%	30	34	49%	52	12	82%
09	55	17.5%	31	33	50.5%	53	11	83.5%
10	54	19%	32	32	52%	54	10	85%
11	53	20.5%	33	31	53.5%	55	9	86.5%
12	52	22%	34	30	55%	56	8	88%
13	51	23.5%	35	29	56.5%	57	7	89.5%
14	50	25%	36	28	58%	58	6	91%
15	49	26.5%	37	27	59.5%	59	5	92.5%
16	48	28%	38	26	61%	60	4	94%
17	47	29.5%	39	25	62.5%	61	3	95.5%
18	46	31%	40	24	64%	62	2	97%
19	45	32.5%	41	23	65.5%	63	1	98.5%
20	44	34%	42	22	67%	64	0	100%
21	43	35.5%	43	21	68.5%			
22	42	37%	44	20	70%			

## Global Presets Page

You can save and recall global presets from the Global presets page (see figure 89). Access the Global presets page by clicking the **Global Presets** link on the left of the Control page.



**Figure 89.** Global Presets Page

### Saving a preset

Save the current configuration (configuration 0) as a preset as follows:

1. Click the **Save Preset** button.
2. Select the desired preset by clicking on one of the presets listed. To create a new preset, click one of the **[unassigned]** buttons. Overwrite an existing preset by clicking an already existing preset.
3. If desired, type over the current name in the box adjacent to the **Save Preset** button.

**NOTE:** The HTML language reserves certain characters for specific functions (see “**Special Characters**” in the “Programming Guide” section).

If you do not rename an unassigned button, the MTPX Plus switcher names the preset as Preset {next available number}.

If you do not rename an existing preset when it is overwritten, the MTPX Plus switcher retains the same name.

4. Click the **Accept** button.

### Recalling a preset

To recall a global preset as the current configuration, click the button associated with the desired preset.

# Ethernet Connection

This section provides a high level discussion of the Ethernet connection to the switcher and a primer on the subject of subnetting. Topics that are covered, include:

- [Ethernet Link](#)
- [Subnetting — A Primer](#)

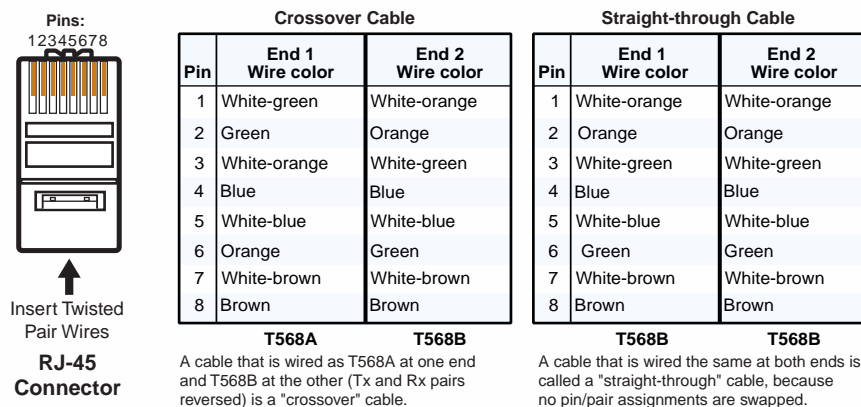
## Ethernet Link

The rear panel Ethernet connector on the MTPX Plus switcher can be connected to an Ethernet LAN or WAN. This connection makes SIS control of the switcher possible using a computer connected to the same LAN.

## Ethernet Connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (see [figure 90](#)).

- **Crossover cable** — Direct connection between the computer and the MTPX Plus switcher
- **Patch (straight-through) cable** — Connection of the MTPX Plus switcher to an Ethernet LAN



**Figure 90. RJ-45 Connector Pinout Tables**

## Default IP Address

To access the MTPX Plus switcher via the LAN port, you need the IP address of the switcher. If the address has been changed to an address comprised of words and characters, you can determine the actual numeric IP address using the ping utility. If the address has not been changed, the factory-specified default is 192.168.254.254.

Ping can also be used to test the Ethernet link to the MTPX Plus switcher.

## Pinging to Determine the Extron IP Address

The ping utility is available at the Command prompt. Ping tests the Ethernet interface between the computer and the MTPX Plus switcher. Ping can also be used to determine the actual numeric IP address from an alias and to determine the web address.

Ping the switcher as follows:

1. On the Windows task bar, click on **Start > Run**.
2. At the Open prompt, type command.
3. Click the **OK** button.
4. At the Command prompt, type `ping {IP address}` and then press <Enter>. The computer returns a display similar to the one shown in figure 91.

```
C:\>ping 192.168.254.254

Pinging 192.168.254.254 with 32 bytes of data:

Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128

Ping statistics for 192.168.254.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

**Figure 91. Typical Ping Response**

The line `Pinging . . .` reports the actual numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

## Pinging to Determine the Web IP Address

The ping utility has a modifier, `-a`, that directs the command to return the web address rather than the numeric IP address.

At the Command prompt, type `ping -a {IP address}` and then press <Enter>. The return display is similar to the ping response shown in figure 91, except that when you specify the `-a` modifier, the line `Pinging mail. . .` reports the web IP address rather than the numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

## Configuring the MTPX Plus switcher for Network Use via the ARP Command

The ARP (address resolution protocol) command tells your computer to associate the MAC (media access control) address of the MTPX Plus switcher with the assigned IP address. You must then use the ping utility to access the controller, at which point the IP address of the controller is reconfigured.

Use ARP to configure the IP address as follows:

1. Obtain a valid IP address for the MTPX Plus switcher from your network administrator.
2. Obtain the MAC address (UID #) of the MTPX Plus switcher from the label on its rear panel. The MAC address should have this format: 00-05-A6-xx-xx-xx.
3. If the MTPX Plus switcher has never been configured and is still set for factory defaults, proceed to step 4. If not, perform a mode 4 system reset and then proceed to step 4. For detailed information on reset modes, see **“Performing Soft System Resets (Resets 3, 4, and 5)”**.

**NOTE:** The MTPX Plus switcher must be configured with the factory default IP address (192.168.254.254) before the ARP command is executed, as described below.

4. At the PC, access the Command prompt (see “**Pinging to Determine the Extron IP Address**” on the preceding page, steps **1** through **3**), then enter the `arp -s` command. Type in the desired new IP address for the unit (obtained in step **1**) and the MAC address of the unit (from the rear panel of the unit), for example  
`arp -s 10.13.197.7 00-05-A6-03-69-B0` and then press {Enter}.

The computer returns the command prompt (C:\).

After you issue the `arp -s` command, the controller changes to the new address and starts responding to the ping requests to the new address, as described in the next step.

**NOTE:** You must ping the MTPX Plus switcher for the IP address change to take place. The response should show the new IP address, as shown in **figure 92**.

5. Execute a ping command by entering ping followed by a space and the new IP address at the command prompt. For example:

`ping 10.13.197.7`

```
C:\>ping 10.13.197.7

Pinging 10.13.197.7 with 32 bytes of data:

Reply from 10.13.197.7: bytes=32 time<10ms TTL=128
Reply from 10.13.197.7: bytes=32 time<10ms TTL=128
Reply from 10.13.197.7: bytes=32 time<10ms TTL=128
Reply from 10.13.197.7: bytes=32 time<10ms TTL=128

Ping statistics for 10.13.197.7:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

**Figure 92. Ping with New Address**

**NOTE:** You can reconnect using either Telnet or a web browser to verify that the update was successful.

6. After verifying that the IP address change was successful, enter and issue the `arp -d` command at the Command prompt. For example:

`arp -d 10.13.197.7` removes 10.13.197.7 from the ARP table

or

`arp -d*` removes all static IP addresses from the ARP table.

## Connecting as a Telnet Client

The Microsoft Telnet utility is available from the Command prompt. Telnet allows you to input SIS commands to the MTPX Plus switcher from the PC via the Ethernet link and the LAN.

Access the Command prompt and start Telnet as follows:

1. On the Windows task bar, click **Start > Run**.
2. At the **Open** prompt, type `command`.
3. Click the **OK** button.
4. At the Command prompt, type `Telnet` and then press <Enter>. The computer returns a display similar to the one shown in figure 93.

```
Microsoft (R) windows 2000 (TM) Version 5.0 (Build 2195)
Welcome to Microsoft Telnet Client
Telnet Client Build 5.00.99203.1

Escape Character is 'CTRL+]'

Microsoft Telnet>
```

**Figure 93. Telnet Window**

## Telnet Tips

It is not the intention of this guide to detail all of the operations and functionality of Telnet; however, some basic level of understanding is necessary for operating the MTPX Plus switcher via Telnet.

### Open

Connect to the MTPX Plus switcher using the `Open` command. Once you are connected to the switcher, you can enter the SIS commands the same as you would if you were using the RS-232 or RS-422 link.

Connect to the MTPX Plus switcher as follows:

1. At the Telnet prompt, type `open {IP address}` and then press <Enter>.
  - If the switcher is not password protected**, no further prompts are displayed until you break or disconnect the connection to the matrix switcher.
  - If the switcher is password protected**, Telnet displays the password prompt.
2. If necessary, at the password prompt, type the appropriate password and then press <Enter>.

Connection to the switcher via the Ethernet can be password protected. There are two levels of password protection: administrator and user. A person logged on as an administrator has full access to all matrix switcher switching capabilities and editing functions. Users can create ties, set mutes, and view all settings with the exception of passwords. By default, the MTPX Plus switcher is shipped with both passwords set to `{carriage return}`.

Once you are logged in, the switcher returns either `Login Administrator` or `Login User`. No further prompts are displayed until you break or disconnect the connection to the MTPX Plus switcher.



## Escape character and Esc key

When Telnet is first started, the utility advises that the Escape character is 'Ctrl+J'. Many SIS commands include the keyboard <Esc> key. Consequently, some confusion may exist between the Escape character and the Escape key.

The Telnet Escape character is a key combination, the <Ctrl> key and the <J> key pressed simultaneously, which returns you to the Telnet prompt while leaving the connection to the MTPX Plus switcher intact.

The Escape key is the <Esc> key on the computer keyboard.

## Local echo

Once connected to the MTPX Plus switcher, by default, Telnet does not display your keystrokes on the screen. SIS commands are typed in blindly and only the SIS responses are displayed on the screen. To command Telnet to show keystrokes, at the Telnet prompt, type `set local_echo` and then press <Enter> before you open the connection to the switcher.

With local echo turned on, keystrokes and the responses of the switcher are displayed on the same line. For example: `1*1!In1 Out1 All`, where `1*1!` is the SIS command and `In1 Out1 All` is the response.

With local echo turned on, all keystrokes are displayed, even those that should be masked, such as the password entry. For example, when entering a password with local echo turned on, you see a display such as `a*d*m*i*n*`, where `admin` is the keyed in password and `*****` is the masked response.

You can turn off local echo by typing `unset local_echo` and then pressing <Enter> at the Telnet prompt. If you are connected to the MTPX Plus switcher and need to access the Telnet prompt to turn local echo off, type the Escape character (<Ctrl>+<J>).

## Set carriage return-line feed

Unless commanded otherwise, Telnet transmits a line feed character only (no carriage return) to the connected switcher when you press the <Enter> key. This is the correct setting for SIS communication with the switcher. The Telnet `set crlf` command forces Telnet to transmit carriage return and line feed characters when <Enter> is pressed, but if `crlf` is set, the SIS link with the switcher does not function properly.

## Close

To close the link to the switcher, access the Telnet prompt by typing the Escape character (<Ctrl>+<J>). At the Telnet prompt, type `close`, and then press <Enter>.

## Help

For Telnet command definitions, at the Telnet prompt, type `?` and then press <Enter>.

## Quit

Exit the Telnet utility by typing `quit` and then pressing <Enter> at the Telnet prompt. If you are connected to the MTPX Plus switcher, access the Telnet prompt by typing the Escape character (<Ctrl>+<J>).

## Subnetting — A Primer

It is not the purpose of this guide to describe TCP/IP protocol in detail. However, some understanding of TCP/IP subnetting (a subnet is a subset of a network — a set of IP devices that have portions of their IP addresses in common) is necessary in order to understand the interaction of the MTPX Plus switcher and the mail server gateway. To understand subnetting at the level required to install and operate the MTPX Plus switcher, you must understand the concepts of a gateway, local and remote devices, IP addresses and octets, and subnet masks and octets.

### Gateways

The MTPX Plus switcher can communicate with the e-mail server that the switcher uses for e-mail notification directly (if they are on the same subnet) or the communication can be routed via a gateway (a computer that provides a link between different subnets).

### Local and Remote Devices

The local and remote devices are defined from the point of view of the function being described. In this guide, subnetting is an issue when you are using the controlling PC to set TCP/IP and e-mail values in the matrix switcher (see [IP Settings/Options Window](#) and [Email Settings Page](#)). When you are setting up the variables for e-mail notification, which may include subnetting, the matrix switcher is the local device and the e-mail server is the remote device.

### IP Addresses and Octets

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called “octets,” separated by dots (periods) (see [figure 94](#)). Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Values of 256 and above are invalid.

Typical IP Address: 192,168,254,254  
Octets

**Figure 94.** Typical IP Address

### Subnet Masks and Octets

The subnet mask (see [figure 95](#)) is used to determine whether the local and remote devices are on the same subnet or different subnets. The subnet mask consists of four numeric octets separated by dots. Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Each octet typically contains either 255 or 0. The octets determine whether or not the same octets of two IP addresses will be compared when determining if two devices are on the same subnet.

255 indicates that this octet will be compared between two IP addresses.      0 indicates that this octet will **not** be compared between two IP addresses.

Typical Subnet Mask: 255,255,0,0  
Octets

**Figure 95.** Typical Subnet Mask

## Determining Whether Devices Are on the Same Subnet

To determine the subnet, the IP address of the local device is compared to the IP address of the remote device (see **figure 96**). The octets of each address are compared or not compared, depending on the value in the related subnet mask octet.

- If a subnet mask octet contains the value 255, the related octets of the IP addresses of the local device and the remote device are unmasked.

**Unmasked octets are compared** (indicated by **?** in figure 96).

- If the subnet mask octet contains the value 0, the related octets of the IP addresses of the local device and remote device are masked.

**Masked octets are not compared** (indicated by **X** in figure 96).

If the unmasked octets of the two IP addresses **match** (indicated by **=** in figure 96, example 1), the two addresses **are on the same subnet**.

If the two unmasked fields **do not match** (indicated by **≠** in figure 96, example 2 and example 3), the addresses **are not on the same subnet**.

	Example 1	Example 2	Example 3
Local IP Address:	192.168.254.254	192.168.254.254	192.168.254.254
Subnet Mask:	255.255.0.0 ( <b>? ? .X.X</b> )	255.255.0.0 ( <b>? ? .X.X</b> )	255.255.0.0 ( <b>? ? .X.X</b> )
Remote IP Address:	192.168.2.25	190.190.2.25	192.190.2.25
Match?:	<b>= .X.X — Match</b> <b>(Same subnet)</b>	<b>≠ .X.X — No match</b> <b>(Different subnet)</b>	<b>≠ .X.X — No match</b> <b>(Different subnet)</b>

**Figure 96.** Comparing the IP Addresses of the Local and Remote Devices

# Reference Information

This section discusses the specifications, part numbers, and accessories for the MTPX Matrix Switchers. Topics that are covered include:

- **Specifications**
- **Part Numbers and Accessories**
- **Mounting the Switcher**
- **Button Labels**

## Specifications

### Video

#### Routing

MTPX Plus 816 .....	8 x 16 matrix, 3 x 1 local
MTPX Plus 128 .....	12 x 8 matrix, 4 x 2 local
MTPX Plus 168 .....	16 x 8 matrix, 3 x 1 local
MTPX Plus 1616 .....	16 x 16 matrix, 3 x 1 local
MTPX Plus 1632 .....	16 x 32 matrix, 6 x 2 local
MTPX Plus 3216 .....	32 x 16 matrix, 6 x 2 local
MTPX Plus 3232 .....	32 x 32 matrix, 6 x 2 local

Gain..... Unity  $\pm$ 1 dB

#### Crosstalk

128 models .....	-76 dB @ 1 MHz, -55 dB @ 10 MHz, -45 dB @ 30 MHz, -30 dB @ 100 MHz
816, 168, 1616 models ....	-80 dB @ 1 MHz, -71 dB @ 5 MHz, -55 dB @ 10 MHz, -45 dB @ 30 MHz, -37 dB @ 100 MHz
1632, 3216, 3232 models	-90 dB @ 1 MHz, -76 @ 5 MHz, -72 dB @ 10 MHz, -60 dB @ 30 MHz, -50 dB @ 100 MHz

Switching speed..... 200 ms (max.)

### Video input — local

Number/signal type .....	3, 4, or 6 analog RGBHV, RGBS, RGsB, RsGsBs, component video (bi-level and tri-level), S-video, composite video
Connectors .....	3, 4, or 6 female 15-pin HD
Nominal level .....	1 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB and for R-Y and B-Y of component video 0.3 Vp-p for C of S-video
Impedance .....	75 ohms $\pm$ 5%
Horizontal frequency .....	15 kHz to 130 kHz
Vertical frequency.....	30 Hz to 150 Hz
Return loss .....	<-30 dB @ 5 MHz
DC offset (max. allowable) .....	250 mV

### Video input — main (see transmitters' output specifications)

Number/signal type .....	8, 16, or 32 proprietary analog signals
Connectors .....	8, 16, or 32 (depending on configuration) female RJ-45 connectors

### Video output — local

Number/signal type .....	1 or 2 analog RGBHV, RGBS, RGsB, RsGsBs, component video (bi-level and tri-level sync), S-video, composite video
Connectors .....	1 or 2 female 15-pin HD
Nominal level .....	0.7 Vp-p for RGB
Impedance .....	75 ohms $\pm 10\%$
Return loss .....	$< -30$ dB @ 5 MHz
DC offset .....	$< \pm 40$ mV with input at 0 offset

### Video output — main (see receivers' input specifications)

Number/signal type .....	8, 16, or 32 proprietary analog signals
Connectors .....	8, 16, or 32 (depending on configuration) female RJ-45 connectors

### Sync — local inputs and outputs only

Input type .....	RGBHV, RGBS, RGsB, RsGsBs
Output type .....	See receiver specifications (on Web site).
Standards .....	NTSC 3.58, NTSC 4.43, PAL, SECAM
Input level .....	3.5 V to 5.0 Vp-p, DC
Output level .....	See receiver specifications (on Web site).
Input impedance .....	611 ohms $\pm 5\%$
Output impedance .....	105 ohms $\pm 30$ ohms
Max. output voltage .....	$= 4.0$ VDC with a 2k ohm load
Max. rise/fall time .....	4 ns
Polarity .....	Positive or negative

### Audio

Routing	
MTPX Plus 816 .....	8 x 16 mono matrix, 3 x 4 local
MTPX Plus 128 .....	12 x 8 mono matrix, 4 x 2 local
MTPX Plus 168 .....	16 x 8 mono matrix, 3 x 4 local
MTPX Plus 1616 .....	16 x 16 mono matrix, 3 x 4 local
MTPX Plus 1632 .....	16 x 32 mono matrix, 6 x 8 local
MTPX Plus 3216 .....	32 x 16 mono matrix, 6 x 8 local
MTPX Plus 3232 .....	32 x 32 mono matrix, 6 x 8 local
Gain (local inputs and outputs) ...	Unbalanced output: 0 dB $\pm 2$ dB with a 600 ohm load, single ended Balanced output: +6 dB $\pm 2$ dB with a 600 ohm load, single ended
Frequency response .....	20 Hz to 20 kHz, $\pm 1$ dB
THD + Noise .....	$= 0.15\%$ @ 1 kHz at nominal level
S/N .....	$> 70$ dB at maximum output (unweighted)
CMRR .....	$> 43$ dB @ 20 Hz to 20 kHz

### Audio input — local

Number/signal type .....	3, 4, or 6 stereo, balanced/unbalanced
Connectors .....	(3, 4, or 6) 3.5 mm captive screw connectors, 5 pole
Impedance .....	$> 10k$ ohms unbalanced
Nominal level .....	+4 dBu (1.23 Vrms), -10 dBV (316 mVrms)
Maximum level .....	+18 dBu, (unbalanced) at 1% THD+N

**NOTE:** 0 dBu = 0.775 Vrms, 0 dBV = 1 Vrms, 0 dBV  $\approx 2$  dBu.

## Audio input — main (see transmitters' output specifications)

Number/signal type .....	8, 16, or 32 proprietary analog signals
Connectors .....	8, 16, or 32 (depending on configuration) female RJ-45 connectors

## Audio output — local

Number/signal type .....	2, 4, or 8 dual mono, balanced/unbalanced
Connectors .....	(2, 4, or 8) 3.5 mm captive screw connectors, 5 pole
Impedance .....	50 ohms unbalanced, 100 ohms balanced $\pm 10\%$
Gain error .....	$\pm 2$ dB channel to channel
Maximum level (=10k ohms) .....	+16 dBu, balanced or unbalanced at 1% THD+N
Maximum level (600 ohm).....	+15 dBm, balanced or unbalanced at 1% THD+N

## Audio output — main (see receivers' input specifications)

Number/signal type .....	8, 16, or 32 proprietary analog signals
Connectors .....	8, 16, or 32 (depending on configuration) female RJ-45 connectors

## Control/remote — switcher host control

Serial host control ports	
MTPX Plus 128 .....	1 RS-232, rear panel 3.5 mm captive screw connector, 3 pole
All other models .....	1 RS-232 or RS-422, rear panel female 9-pin D connector 1 RS-232 front panel 2.5 mm mini stereo jack
Baud rate and protocol.....	9600 baud (default), 19200, 38400, and 115200 (adjustable); 8 data bits; 1 stop bit; no parity
Serial control pin configurations	
9-pin female D connector .	RS-232: 2 = Tx, 3 = Rx, 5 = GND RS-422: 2 = Tx-, 3 = Rx-, 5 = GND, 7 = Rx+, 8 = Tx+
Mini stereo jack .....	Tip = Tx, ring = Rx, sleeve = GND
Captive screw connector ..	RS-232: 1 = Tx, 2 = Rx, 3 = GND
USB control ports	
MTPX Plus 128 .....	1 front panel female mini USB B
USB standards	
MTPX Plus 128 .....	USB 2.0, low speed
Ethernet control port.....	1 RJ-45 female connector
Ethernet data rate .....	10/100Base-T, half/full duplex with autodetect
Ethernet protocol .....	ARP, ICMP (ping), IP, TCP, UDP, DHCP, HTTP, SMTP, Telnet
Default settings.....	Link speed and duplex level = autodetected IP address = 192.168.254.254 Subnet mask = 255.255.0.0 Gateway = 0.0.0.0 DHCP = off
Web server .....	Up to 200 simultaneous sessions 16 MB nonvolatile user memory
Program control .....	Extron control/configuration program for Windows® Extron Simple Instruction Set™ (SIS™) Microsoft® Internet Explorer® version 6 or higher, Telnet

## Control/remote — external device (pass-through, unidirectional, or bidirectional)

Serial control ports .....	RS-232, 3.5 mm captive screw connectors, 3 pole
3232 and 1632 models ....	16 connectors
3216, 1616, 128, and 816 models .....	8 connectors
168 models .....	4 connectors
Baud rate and protocol.....	Up to 38400 baud, 9600 baud (default); 5-8 data bits; 1 or 2 stop bits; odd, even, or no parity; XON, XOFF, or no flow control

**NOTE:** Protocol is mirrored between the switcher and the receiver.

Serial control pin configurations .. 1 = Tx, 2 = Rx, 3 = GND

## General

Recommended cable type .....	Shielded or unshielded CAT 5/5e/6/7 or Extron Enhanced Skew-Free™ AV UTP
Power .....	100 VAC to 240 VAC, 50-60 Hz, internal
1632, 3216, 3232 models	220 watts
816, 168, 1616 models ....	120 watts
128 model.....	73 watts
Temperature/humidity .....	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Cooling .....	Fan, left to right (as viewed from the front panel)
Thermal dissipation	
128 model	
115 VAC, 60 Hz .....	231.1 BTU/hr
240 VAC, 50 Hz .....	223.8 BTU/hr
1616 model	
115 VAC, 60 Hz .....	348.3 BTU/hr
240 VAC, 50 Hz .....	353.0 BTU/hr
3232 model	
115 VAC, 60 Hz .....	607.1 BTU/hr
240 VAC, 50 Hz .....	595.3 BTU/hr
Rack mount.....	Yes
Enclosure type.....	Metal
Enclosure dimensions .....	Depth excludes connectors, width excludes rack ears.
1632, 3216, 3232 models	5.25" H x 17.0" W x 9.4" D (3U high, full rack wide) (13.3 cm H x 43.1 cm W x 23.9 cm D)
816, 168, 1616 models ....	3.5" H x 17.0" W x 9.4" D (2U high, full rack wide) (8.9 cm H x 43.1 cm W x 23.9 cm D)
128 model.....	1.7" H x 17.4" W x 12.0" D (1U high, full rack wide) (4.3 cm H x 44.2 cm W x 30.5 cm D)
Product weight	
1632, 3216, 3232 models	16.0 lbs (7.3 kg)
816, 168, 1616 models ....	8.5 lbs (3.9 kg)
128 model.....	3.7 lbs (1.6 kg)
Shipping weight	
1632, 3216, 3232 models	26 lbs (11.8 kg)
816, 168, 1616 models ....	18 lbs (9 kg)
128 model.....	7 lbs (4 kg)
DIM weight (International)	
1632, 3216, 3232 models	26 lbs (11.8 kg)
816, 168, 1616 models ....	18 lbs (9 kg)
128 model.....	7 lbs (4 kg)
Vibration .....	ISTA 1A in carton (International Safe Transit Association)

Regulatory compliance	
Safety .....	CE, c-UL, UL
EMI/EMC .....	CE, C-tick, FCC Class A, ICES, VCCI Class A
Environmental .....	Complies with the appropriate requirements of WEEE.
MTBF .....	30,000 hours
Warranty .....	3 years parts and labor

- NOTES:**
- All nominal levels are at  $\pm 10\%$ .
  - Specifications are subject to change without notice.

## Part Numbers and Accessories

### MTPX Plus Matrix Switcher Part Numbers

Matrix switcher part numbers	Part Number
MTPX Plus 816	60-834-01
MTPX Plus 128	60-1015-01
MTPX Plus 168	60-833-01
MTPX Plus 1616	60-832-01
MTPX Plus 1632	60-898-01
MTPX Plus 3216	60-899-01
MTPX Plus 3232	60-897-01

### Included Parts

These items are included in each order for an MTPX Plus matrix switcher:

Included parts	Part Number
Tweezer (small screwdriver)	
<i>MTPX Plus Matrix Switcher Setup Guide</i>	
5-pole captive screw audio connectors (6, 7, or 14, depending on the model)	
3-pole captive screw connectors (5, 8, or 16, depending on the model)	
MTP Signal Generator (all <b>except</b> MTPX Plus 128)	70-729-01
Extron Software Products DVD (Matrix Switchers Control Program and Button-Label Generator)	

### Replacement Parts and Accessories

Replacement parts	Part Number
Button and cap diffuser kit	70-352-01
Button overlays	
MTP Signal Generator (suggested for MTPX Plus 128)	70-729-01
5-pole captive screw audio connectors (qty. 10)	100-460-01



## Optional Accessories

These items can be ordered separately:

Adapters, mounting, controllers, connectors	Part Number
MBD 149 1U through desk and rack mounting kit (for MTPX Plus 128 only)	70-077-03
MKP 2000 matrix switcher X-Y remote control panel	
Black	60-682-02
White	60-682-03
MKP 3000	
Black	60-708-02
White	60-708-03
MKP 3000 MAAP	
Black	60-709-02
White	60-709-03
MKP 3000 L (lectern mounted)	60-709-22

## Cables

**NOTE:** Enhanced Skew-Free™ A/V UTP cables are not recommended for Ethernet LAN applications..

Enhanced Skew-Free™ A/V cable	Part Number
<b>UTP23SF</b> Enhanced Skew-Free A/V UTP cable (cut, various lengths)	26-569-xx
<b>UTP23SF</b> Enhanced Skew-Free A/V 1000' UTP (Bulk) (non-plenum)	22-141-03
<b>UTP23SF-4P/1000</b> Plenum enhanced Skew-Free A/V UTP cable (bulk), 1000' (300 m)	22-142-03

Male-to-female VGA molded connector cables	Part Number
VGA M-F MD series, 3' (0.9 m) to 100' (30.4 m)	26-112- <i>nn</i>

Male-to-female VGA backshell connector cables	Part Number
VGA M-F BK series, 3' (0.9 m) to 100' (30.4 m)	26-112- <i>nn</i>

Male-to-male VGA molded connector cables	Part Number
VGA M-M MD series, 3' (0.9 m) to 100' (30.4 m)	26-238- <i>nn</i>

Male-to-male VGA molded connector cables	Part Number
VGA M-M BK series, 3' (0.9 m) to 100' (30.4 m)	26-238- <i>nn</i>

## Connectors

Connector	Part Number
CAT 6 jack (black), qty. 10	100-476-01
CAT 6 jack (red), qty. 10	100-477-01
CAT 6 jack (blue), qty. 10	100-478-01
CAT 6 jack (orange), qty. 10	100-479-01
CAT 6 jack (gray), qty. 10	100-480-01
CAT 6 jack (white), qty. 10	100-481-01
CAT 6 jack (ivory), qty. 10	100-482-01

## Mounting the Switcher

The MTPX Plus switchers are housed in a 1U high (MTPX Plus 128), 2U high (other matrix sizes 1616 and smaller), or 3U high (matrix sizes 1632 and larger) metal enclosures. The 1U enclosure is rack mountable using the provided MBD 149 Through-desk and rack mounting kit (part number **70-077-03**). The 2U and 3U enclosures are mountable without extra hardware.

### Tabletop Use

For tabletop use, affix one of the supplied self-adhesive rubber feet to each corner of the bottom of the switcher.

### UL Rack-Mounting Guidelines

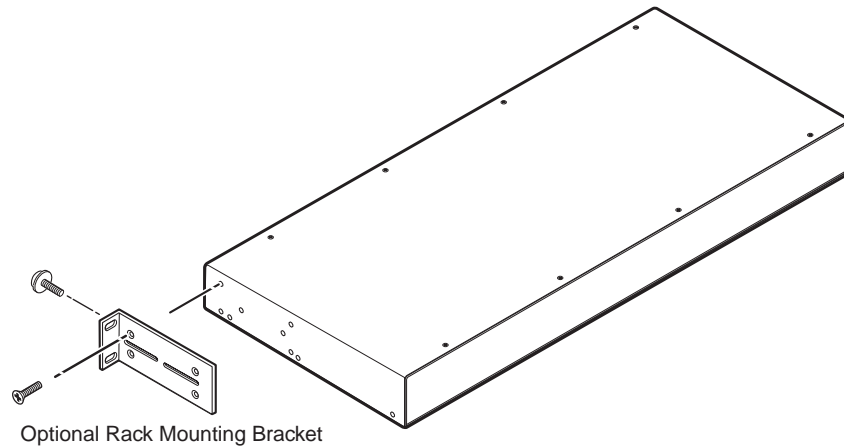
The following Underwriters Laboratories (UL) requirements pertain to the installation of the matrix switcher into a wall or furniture.

- 1. Elevated operating ambient temperature** — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the maximum ambient temperature ( $T_{ma} = +122\text{ }^{\circ}\text{F}$ ,  $+50\text{ }^{\circ}\text{C}$ ) specified by Extron.
- 2. Reduced air flow** — Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- 3. Mechanical loading** — Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- 4. Circuit overloading** — Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- 5. Reliable earthing (grounding)** — Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as use of power strips).

## Mounting Instructions

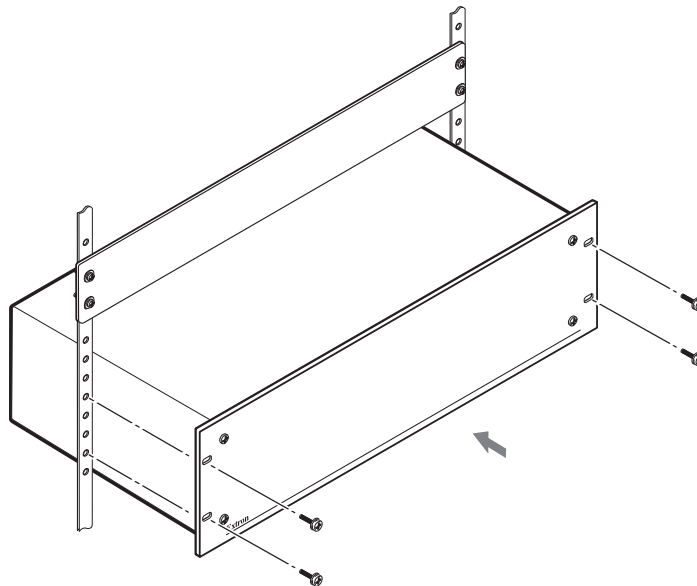
If desired, rack mount the unit as follows:

1. If feet were installed on the bottom of the transmitter assembly, remove them.
2. **MTPX Plus 128 only** — Fasten the optional MBD 149 rack mounting brackets (part number **70-077-03**) to the unit using eight machine screws supplied with the kit (see figure 97).



**Figure 97. Attaching the Mounting Brackets**

3. Insert the switcher into the rack, aligning the holes in the mounting flanges with those in the rack (see figure 98).



**Figure 98. Installing the Switcher in a Rack**

4. Secure the switcher to the rack using the supplied bolts.

**NOTE:** Extron recommends that you allow 1U of rack space above and below the switcher for ventilation..

## Button Labels

Page 162 provides strips of blank button labels. If desired, copy them or cut them out, write button information in each button area as desired, and put them in the input or output button windows. You can also create labels using the Button-Label Generator software (see “**Button-Label Generator**” in the “Matrix Software” section).

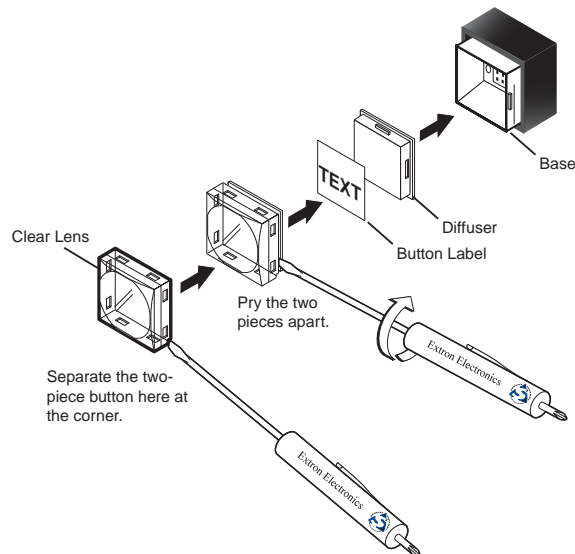
### Installing Labels

Install new labels in the matrix switcher front panel buttons as follows:

1. Make new labels using either the blanks on [page 162](#) or the Button-Label Generator software. Cut them out.

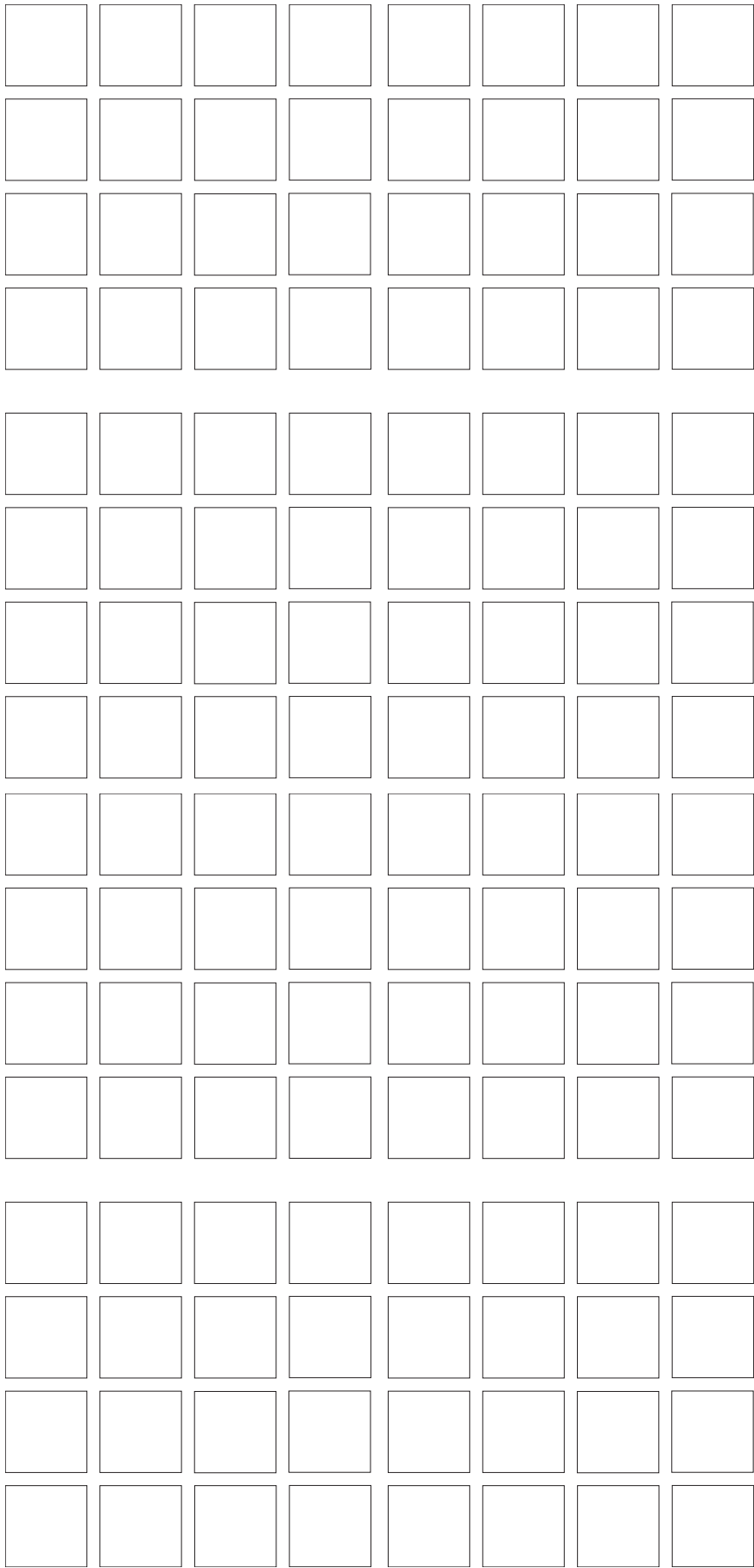
**NOTE:** For best results, print on transparent or translucent material..

2. Remove the button from the MTPX: use a small, flat bladed screwdriver to gently pry a button out from the front panel (see figure 99).



**Figure 99. Illuminated Button Label Replacement**

3. Locate the notch in the corner of one side of the clear button cap lens.
4. Separate the white backing (diffuser) from the clear button cap (lens): insert the blade of the small screwdriver into the corner notch and gently twist the blade.
5. Save the translucent, white diffuser, but remove the text/label insert from the transparent button cap lens.
6. Insert the replacement button label into the button cap. Check for correct label orientation.
7. Align the white diffuser plate with the cap (lens). The bumps on the diffuser plate should be aligned (top and bottom) with the notches on the clear button cap. Firmly snap it into place.
8. Align the tabs on the plunger of the MTPX with the notches on the diffuser plate. Gently, but firmly, press the reassembled button into place in the front panel of the switcher.
9. Repeat steps 2 through 8 as needed to relabel other buttons.



Button label blanks, 16-button strips

# Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

**USA, Canada, South America, and Central America:**

Extron Electronics  
1001 East Ball Road  
Anaheim, CA 92805  
U.S.A.

**Japan:**

Extron Electronics, Japan  
Kyodo Building, 16 Ichibancho  
Chiyoda-ku, Tokyo 102-0082  
Japan

**Europe, Africa, and the Middle East:**

Extron Europe  
Hanzeboulevard 10  
3825 PH Amersfoort  
The Netherlands

**China:**

Extron China  
686 Ronghua Road  
Songjiang District  
Shanghai 201611  
China

**Asia:**

Extron Asia  
135 Joo Seng Road, #04-01  
PM Industrial Bldg.  
Singapore 368363  
Singapore

**Middle East:**

Extron Middle East  
Dubai Airport Free Zone  
F12, PO Box 293666  
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or if modifications were made to the product that were not authorized by Extron.

**NOTE:** If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

**USA:** (714) 491-1500  
**Asia:** +65.6383.4400

**Europe:** +31.33.453.4040  
**Japan:** +81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron USA - West Headquarters	Extron USA - East	Extron Europe	Extron Asia	Extron Japan	Extron China	Extron Middle East
+800.633.9876 Inside USA/Canada Only	+800.633.9876 Inside USA/Canada Only	+800.3987.6673 Inside Europe Only	+800.7339.8766 Inside Asia Only	+81.3.3511.7655 +81.3.3511.7656 FAX	+400.883.1568 Inside China Only	+971.4.2991800 +971.4.2991880 FAX
+1.714.491.1500 +1.714.491.1517 FAX	+1.919.863.1794 +1.919.863.1797 FAX	+31.33.453.4040 +31.33.453.4050 FAX	+65.6383.4400 +65.6383.4664 FAX		+86.21.3760.1568 +86.21.3760.1566 FAX	